



INDUSTRIAL-ARTS MAGAZINE

Incorporating: **HANDICRAFT** and the **ARTS AND CRAFTS MAGAZINE**

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INDUSTRIAL-ARTS MAGAZINE

Vol. V

OCTOBER, 1916

No. 10

EDUCATION AS PREPAREDNESS

C. A. Prosser, Director of Dunwoody Institute, Minneapolis



EVEN if there were no educational philosophers, rare and precious as they are, and even if there were no doctrinaires in education, numerous and persistent as they are, the time will probably never come when any definition of the aim and meaning of the educational process will be accepted by all.

Like the blind men who, approaching the elephant each from a different point, described him each in a different way, so the thinkers in education must always state the purpose of the schools from the viewpoint of their widely differing economic, political, social, religious and educational ideals. Nevertheless, the historian looking back upon any epoch can catch, amid the babel of contending ideas, the dominant note of the age and see amid the great variety, even confusion of educational method and device—the chief tendency, the largest aim of its schools.

Broadly speaking, there have been three pronounced periods in the social, political and economic thought of the American people, thru the last of which we are now passing.

The first period stretching from Yorktown to Appomattox Court House was the age in which large emphasis was laid upon the safety and well-being of the Young Republic as over against the interests of the individual. While America was then as now, hailed as the land of opportunity for the ambitious and the energetic, our forefathers battling against the wilderness felt with a greater keenness than any subsequent age their dependence upon the state. If the new experience in Representative Government was to endure, there must be intelligent direction on the part of the rich and the well-born, and intelligent following of prophets and statesmen by the rank of the country's citizens. So our forefathers gave rich grants to colleges in order that they might fit the fortunate and capable youth for professional and political leadership, while the little red schoolhouse blossomed on the hillside hard by the cabin of the pioneer. In keeping with the spirit of the day, the shibboleth with which for more than a half century the schools rallied larger and still

larger support to their development, was "Education as training for citizenship."

The second period stretching from the close of the Civil War to the dawn of the Twentieth Century was an age which, in its thought and in its policies, laid the emphasis on individual interests and individual success as over against the social interest and social well-being of the many. Close upon the heels of the Rebellion the country entered upon a period of prosperity unparalleled, up to that time at least, in the history of any people. The opening up of our vast natural resources, the development of our rich agricultural lands, the settlement of new territories, the admission of new states, the rapid rise of our cities, the magic growth of our teeming industrial life—all these offered opportunities for individual initiative and individual endeavor beyond the wildest dreams of the pioneers of a simpler day.

State and national government, dazzled by our new-found opulence, left capital unregulated to work its way regardless either of the privilege and power which it acquired or of the ultimate effect of a laissez-faire policy upon our welfare as a people. The statesmen of the last half of the nineteenth century were counted great or small not as they contributed to sound and lasting political principles and policies, but as under the spell of the opportunism of the hour they brought to pass laws under which the speculator and the business captain might undisturbed pile higher the hoard of their possessions.

It is not strange that the schools of the period, reflecting as they always do the social and political ideals of the day, should no longer state as their dominant aim the safety and the well-being of the Republic but express it in terms of individual ambition, individual preparation, individual culture, individual interests, individual achievement, individual success.

Education became to the closing half of the last century "child nurture" rather than country nurture. "Preparation (of the individual) for life" was a shibboleth with which teachers' gatherings wrestled long and often. After a while "adjustment (of the individual) to life" was a rephrasing that came to take its place. Hanus gave us perhaps the best of all the definitions with which the nineteenth century

Editor's Note—This paper constituted the basis of an address before the Harvard Teachers' Association, May, 1916.

emphasized the large duty which the schools owe to the child at the threshold of a career, when he declared the purpose of education to be "the preparation (of the child) for complete living."

Looking upon education as the process by which the heritage of knowledge accumulated by the race in the past was conferred upon each generation, Butler defined the work of the schools as that of conferring (upon the individual) the five great inheritances of science, art, history, literature and religion. Unfortunately, he omitted the child's vocational inheritance and failed to emphasize the dynamic side of the teaching process, which is to so train not the child but each generation, that it may transmit its heritage of knowledge and skill enlarged and enriched to posterity.

Training for citizenship was still regarded as a patriotic duty which the schools must discharge; but this end came more and more to be regarded as the by-product of an educational system designed primarily to give culture and to open opportunities for personal success. Preparation for citizenship was to be gained largely, if not entirely, thru the advancement of general intelligence, the inculcation of well-recognized civic virtues. The idea was never consciously forgotten that in some way education should provide the economic and social well-being of the nation; but reflecting the spirit of an age which chased the will-of-the-wisp of the unrestrained ego, the schools fanned the flame of personal ambition and personal achievement, laid large stress upon rights and opportunities and reduced the teaching of the duties and responsibilities of citizenship to the catch phrases of preachment and the symbolism of flag and march and song.

The third period in our social and political development thru which we are now passing is one in which we are laying increasing emphasis upon our social and political well-being as over against the unrestrained rights and interests of the individual.

Almost with the opening day of our own century, ideas and forces which had been gathering strength for two decades, burst into fruition and brought in their wake a change in our conception of the meaning and purpose of the educational process. It will, of course, be impossible here to give any adequate discussion to this new and tremendous social and economic movement which has so stirred us as a people and wrought such havoc with old and well established economic, social, political and educational ideas.

We are passing so rapidly that we can scarcely see the milestones along the way from the time-honored conception of *democracy as freedom* within the law, to the larger and wider view of *democracy as conservation*—conservation of the economic and social as well as the political well-being of its citizens. To be sure, we have always hoped to secure the

economic and social well-being of all. In the past, however, we believed we could get it as a by-product of a laissez-faire policy where under the guarantees of political freedom and so-called equal opportunities for all, unrestrained individualism might climb to dizzy heights of wealth and power while at the same time national prosperity might be gained for all. Now, by collective action and governmental regulation, the nation is beginning to work consciously for the interests of the common man.

The causes of this changed and changing social and political attitude are too numerous to even enumerate. First of all, there has been a pronounced reaction against the results of the extreme individualism of the last century. This had brought swollen fortunes, predatory wealth, the sad waste of our natural resources, the growth of trusts and combines, the overthrow of our proud inheritance of free competition in trade, corruption in high places, and a privileged class under the law, things which struck at the foundation of democracy and imperiled the safety and perpetuity of the nation. Even a golden age of prosperity is bought at too great a price if it results in the loss of power to the people. While fabulous fortunes may dazzle for the nonce they make, whenever wrongly used at least, only too glaringly plain the tragic gap between the favored few and ten million citizens at the point of subsistence. Riches selfishly employed are a criminal use of what is after all social wealth—the fruits of co-operation and common toil gathered by the capable or the fortunate as trustees of society.

There had been working into the national conscience gradually but surely, a sense of responsibility for the welfare of the common man—the average American citizen—which could no longer be discharged by the mere guarantee of political, social and religious freedom. This sense of responsibility was no child of this or of any past century. It has been an evolution which has seemingly paralleled the growth of civilization and democracy.

We have, however, arrived at a point in our social philosophy when we can see the distance across which the race has traveled and appreciate the far-reaching effects of the great economic and social changes already accomplished. These effects are leading us slowly but surely on to goals many of which we can now see but dimly if at all.

The earlier centuries, as Patten has so clearly pointed out, were ages of social deficit. Our own has a social surplus. Then there was not enough of social wealth, food, clothing, shelter for all. Wars and pestilence were welcomed as a divine visitation designed to make life possible for those who survived. The common man was in the way, else Providence which had permitted him to be born would not have been so niggardly in providing for his sustenance. Today there is abundance for all if the goods of life

could be more equitably distributed. Then the emphasis was laid upon production and the laissez-faire policy in government was born quite as much of the great need for encouraging the effort to produce more of the goods of life, as it was of the predatory instinct of the ruling classes. The largest economic problem of the Twentieth Century is to secure the more equitable distribution of social wealth among all the people and the use of a social surplus for the common weal. The common man must be important and worthy of conservation else Providence would not have provided so abundantly for him.

In the earlier centuries there was practically no knowledge of the causes of sickness, disease, defects, misery and crime. The later ages have with their larger resources, their better facilities, and their wider knowledge and experience traced these enemies of man to their lair. We have guilty knowledge of the preventive causes lying back of weakness and suffering and sin. Like the first pair in the Garden, that guilty knowledge has laid upon the shoulders of our common citizenship a responsibility from which we can nevermore escape—and to which we must, if we are to avoid the guilt and banish the suffering and the crime, apply collective action and a large measure of our swelling social wealth.

The unfolding of the centuries, the increase of learning, the spread of intelligence, the study of human problems, the common fight against the more glaring social and political wrongs, the rise of democracy and the common man, a growing sense of the interdependence of all our lives in the campaign for health and morals and happiness and safety, our guilty knowledge of the ways in which the lot of our fellows may be bettered, our quickened appreciation of the importance of this life, the sacredness of human lives and the importance of the man in the mass—have bred in us a tender conscience toward every phase of the struggle for human life in an age which is answering in clarion tones "yes" to the question which Cain sent thundering down the ages.

This changed and quickened social attitude is already affecting every phase of our life. Courts and legislatures are being forced to restate the ancient principles of law to meet the changed economic and social conditions and ideas of our day. Churches must fearlessly apply the teachings of the Sermon on the Mount to the sore spots of modern industry before they will ever regain the confidences of the masses. *Materia medica* is changing from remedial to preventive measures, while the doctor and the nurse have become our most effective social workers. Even our technical schools have at last introduced courses in human engineering.

This emphasis upon social well-being has already caused many to restate the aim of education in catch phrases, which set forth the interests of the mass as

over against the individual. This new statement of aim has gone thru the three phases of education as efficiency, education as conservation and education as preparedness.

Doubtless the last two decades will be known best by the fine passion for efficiency in every aspect of life, but more especially in productive industry including agriculture which has taken possession of these times. Here again it would be impossible to give all the factors which have played a part in the great movement for a more efficient and productive life. The growth of scientific knowledge and its use in industrial and agricultural processes, the rise of the industrial and agricultural engineer, large scale production, extreme division of labor and the specialized machine—all these have not only opened up possibilities for better organization and system and method of raising or making goods, but have helped to create a demand for it from those engaged in the conduct of shops and factories flushed and confident because of obstacles already conquered and victories already achieved.

But the demand of the age for greater efficiency in the individual as well as in the process, also rests on more fundamental grounds. Society is entering upon a program for the wider use of social wealth for the common good. This is the meaning of the income tax, the inheritance tax, the rising excise tax, the determined search for sequestered property and the mounting tax for city and state purposes. This is the meaning of the regulation of trusts and railroads, the advance of municipal ownership, the establishment of public parks and recreational centers, the clearing of the breathing space, the fight for cheap transportation and the rising budget of public schools free as the living waters.

Man is engaged in a gigantic battle against nature from whose hands he wrests sustenance and comfort. The fight to make forest, field, mine and shop yield more abundantly grows more difficult with the rapid disappearance of our boasted natural resources. Scientists tell us the time will come when the argon nitrogen of the atmosphere will be exhausted. Consequently, man must invent some way to supply the growing deficiency so that life may be supported on this globe. Every succeeding generation, therefore, calls for greater efficiency in all its workers if we are to eliminate waste, to conserve natural riches, to put more value into nature's products, to make more goods to supply human wants.

Our day is calling for greater efficiency in the interest of the new democracy of conservation. If we are to discharge the grave responsibility which rests upon us for the use of our social surplus to make the crooked places straight, to achieve social justice, to make equal opportunity for all, or an irreducible minimum of decency and comfort, to establish a truly democratic system of education which, throw-

ing aside the shackles of an outworn social and educational philosophy, shall minister to the widely varying interests, abilities and tastes of all the children of all the people, then we need to wrest from the forces of nature a greater and a still greater return in the goods of life—in the social surplus controlled by collective action which shall supply the wherewithal for this social program.

It is the vital, almost sacred, importance of the issues at stake and the magnitude of the problems to be solved that has caused society to view no longer with toleration and amusement, but with indignation and a growing hostility, the idler, the tramp, the unemployed rich and the wastrel; and to accept so eagerly the movements for vocational education, vocational guidance and scientific management.

There can be no doubt that the movement to secure a more practical education in the American public school system has been hastened by our knowledge of the rapid rise of the German nation in industry and in commerce, as the result of the system of industrial and commercial education inaugurated by the far-seeing Bismarck, more than a generation ago, and our realization that as a competitor in the world's markets, this country must be able to put more brains and skill and workmanship into the things it fashions and sends down to the ships by the sea.

It is true that education for efficiency must focus its efforts on the individual and in order to make the country more capable, must make each citizen more intelligent and more skillful in his work whatever it may be. But the aim of education so stated shifts the emphasis from the individual as the all-important consideration, to the idea of efficiency as a social need.

When we consider the equipment which men need to support with larger resources the new social program, we emphasize education as efficiency; but when we consider the ends which an awakened social conscience has in view, we are speaking of education as one phase of the movement for human conservation.

Education is human conservation in proportion as it trains a sound mind in a sound body, as it makes the future citizen an efficient social economic unit, as it improves old courses and methods and adopts new ones to meet the needs of groups long neglected, as it ceases to select for further education and for vocations by elimination and begins to select by training. All the innovations which the Twentieth Century noonday is sending into the schools of the nation—medical inspection, the dental clinic, the visiting nurse, the gymnasium, the playground, the bath and the swimming pool, special classes for subnormal children, differentiated courses in the upper grades, the Junior High School, prevocational training and vocational guidance, the evening school center, the compulsory continuation school, the industrial trade and agricultural school and rich vocational courses in the regular high school—all

these and many more can be justified quite as well from the standpoint of conservation as of efficiency.

The European War came upon the American people like a flash of lightning out of a smiling summer sky. They were first astounded, then stupified and finally terrified. When our sober second thought had been restored, we began to cast accounts and to undergo a process of self-searching such as we had never undergone as a people in all our past history. This self-study of our resources and conditions spread thru an ever-widening circle of matters and topics as the waves spread from the disturbance made by the crashing of a stone into a quiet pool.

At first our hopes and fears ran the crests of all the questions involved in the safety of the country from immediate attack. Could our navy as the first line of defense repel the attack of a foreign fleet? Would our coast defenses as the second line withstand the assaults of a victorious navy? Are we able to mobilize enough troops properly armed and drilled to prevent the landing of a more or less debatable number of hostile soldiers as the first installment of an invading army? Is our state militia a liability or an asset? Will a volunteer soldiery, such as that of the Civil War, be of much avail under the conditions of Twentieth Century warfare? Could factories and shops, munition plants and mines, food depots and railroads be mobilized under government control so as to provide effective support to army and navy? Would our large and unassimilated foreign population prove faithful to the land of their adoption? Will capital and labor be able to forego or reconcile their differences in the face of a great national peril?

All these things have to do largely with our immediate safety from attack, while preparations are being made to put the country on a better basis of defense so far as military strength is concerned. When the discussion shifted, as much of it soon did, to the issues involved in our future safety and strength as a people, it was quickly recognized in much of the current discussion, that the problem of preparedness, which this country is facing, is social and economic as well as political and military, and that to meet it the schoolmaster and the social worker are as badly needed as the technician and the business captain.

"Education as preparedness" is the new phrase with which we are emphasizing in growing degree the need for the use of the schools to prepare all for social well-being in a peaceful Republic able to take care of itself in time of war but more efficient still in the piping times of peace—a Republic where millions of efficient, justly rewarded and justly treated citizens shall fill the land with the music of patient, orderly toil and write on the pages of the world's history new achievements in the realization of democracy and the conservation of men.

In considering education as preparedness for the future, one has a subject broad and varied enough

for a dozen addresses as long as this. Much attention, for example, could be directed to the reforms which are needed in our present plans for training leaders for every kind of social, economic, political and educational activity. While it is the secondary school, which is today most under fire because it lies closer to the great mass of people and is much more susceptible to popular control, changes in organization, courses and methods are, if anything, even more greatly needed in our colleges and universities, if they are to prepare leaders, who will be able to think straight amid the complex situations of our own and the coming day and be able to use the equipment which the schools have given them as men of affairs as well as mere academic theorists.

Two phases of the use of education as preparation for a stronger and a safer country appeal to me at this time. One is the use of the schools to develop the latent possibilities of all our future citizens, and the other is the use of the schools to develop a better patriotism among our future citizens.

There are in the public schools of the United States this present school year more than 20,000,000 children. What we are to be as a people during the coming generations lies buried, as the oak in the acorn, in this stupendous army of embryo citizens. They may run the entire gamut of possibilities for good and evil, for industry and idleness, for efficiency and inefficiency, for talent and toil, for selfishness and devotion to family and country. What they are to be rests in large measure with the schools. These future citizens possess every variety of interest, temperament, strength, weakness, taste and ability. Foolish is the schoolmaster, who in his zeal for a standardized education, attempts to force them all into one mold! These children are the richest asset which the country possesses—an asset far more important even than the swelling value of the annual product of our shops and fields and mines. The uncovering and the proper development of the best—even tho it be only the one talent—there is in each and all these citizens of the future, is the most important duty to posterity, which the country owes and which it must discharge largely thru its schools.

How shall the schools discharge this all-important task? They must first of all recast their conception of education so as to think of it in terms of efficiency for labor and life, of conservation of diversified interests and tastes and abilities, of preparedness of a diversified citizenship for a diversified life shot thru and thru with common ideas of conduct and morals, of justice and citizenship.

How can these ends be gained? Not by the blind following of some outworn philosophy of education born of the simple conditions and narrow outlook of a day that is past. Not by uniform courses of study for all. Not by standardized training and requirements for all. Not by the refining of method to the

exclusion of long neglected groups. Not by the expenditure of enormous sums of money on palatial buildings for the old groups we have reached in the past and the refusal because of lack of funds to meet the needs of those for whom the schools have thus far done so little.

Not by slavishly bowing to the domination of higher education over the work of elementary and high school. Not by resisting the just claims of pre-vocational and vocational education. Not by flouting every honest effort to broaden and enrich the work of the schools. Not by continuing to cling to the education of a gentleman—an idea we borrowed and copied from our English cousins—if by a gentleman is meant one who has passed thru a disciplinary drill in the ancient cultures but does not know anything useful or worth while in a modern environment. Not by insisting that manual training is industrial education and school gardening is agriculture. Not by confusion in the use of definitions and terms.

Not by leaving entirely to the social worker and the child labor advocate the opportunity as well as the task of shaping the legislation which controls the education and the labor of the adolescent boy and girl. Not by evening schools poorly organized and equipped with inefficient teachers struggling to conduct in the cities ungraded country classes whose pupils run the gamut of age, education, experience and ability. Not by refusing to grapple with the problems of selecting and training youth for vocations, because the task is too much trouble and it is so much easier to drift thru the old paths and do things in the old ways.

Not by school systems whose teachers are paid less than the policeman and the fireman and have no protection against the failing years of life. Not with the present school budget and in many instances not without help from state and national government to supplement the limited taxing resources of local schools. Not as long as the schools in many places continue to be dragged thru the mire of local politics, and merit and efficiency wait upon prejudice and favoritism. Not until the American people, realizing fully what they too often now see but dimly that the schools are the chief hope of the nation, rise in their might to set education above the domineering influence of politics, to make it the best conducted business and profession in the land.

In almost every schoolroom in America we have been carrying on two different processes of training which are diametrically opposed to each other in principle if not in aim. Thru one of these we have been endeavoring to teach patriotism by symbolism and precept. Schools have their patriotic exercises, their songs, their marches behind waving banners, their special days to commemorate the deeds of the nation's honored dead. On the blackboards are dis-

played such preachments as "America, Land of Liberty," "Love your Country," "Be willing to die for your country," "The United States is the greatest country in the world." To these devices we have fastened our faith hoping that thru the mysterious working of Providence they would in some way result in a devoted citizenship.

At the same time the school has surrounded these same children with an atmosphere very much like that of the typical American home which inculcates sometimes indirectly but too often directly, the idea that the great purpose of the school is to prepare the pupil for the largest possible individual success and the pursuit in a selfish and determined way of his own ends in life. Much is said of rights and opportunities but little is taught in any effective way at least of duties and responsibilities.

Recently I examined a copy book not more than five years old and still used extensively in many parts of the United States. On pages facing each other I found these copies to be written over and over again by the pupil: "Vanderbilt is a rich man. You can become a rich man;" "Carnegie was a great business captain. You can become a great business captain;" "Lincoln was President of the United States. You can become President of the United States."

The tacit attitude of the school toward the child is too often—"This school is for your individual benefit—your training, your pleasure, your recreation, your culture, your preparation, your success." "Make the most of it now so that when you leave school you may be able to win for yourself a big place in life, because that is the most important thing and by it your own success and that of the school will be measured." In our desire to stimulate children to do the school work one wonders whether we have not used to the limit the spur of personal interest and personal ambition by the constant preachment of the idea that the things worth while in life are to be measured by money and position and power rather than in endeavor, in service, in patient, systematic, orderly toil, in obedience to law, in a due regard for the well-being of our fellows, in citizenship that gives at least as much in duty as it takes in rights and opportunities.

It is not strange that the schoolroom has not escaped this spirit of individualism which may yet wreck us as a nation. After all, they but reflect the spirit of the age. On my way from the West to this meeting I rode with a very prominent manufacturer, who said to me, "If this prosperity keeps up five more years, I will have made my pile. Then I am going to quit." By questioning I found that he denied any responsibility for the future welfare of his employees. "I have paid them all they are worth and owe them nothing." Nor was he conscious of any responsibility for his plant as a fortress in the industrial defense of the country. "I have always

paid my taxes and have never been in trouble. My obligation has been paid." This man spoke the words that lie at the lips today of many of what are known as America's best citizens.

We owe much to the educational precept that the school should strive to secure the development—the expression of the individualism of the child. Most of the great improvements that have been made in our methods of teaching have come from the efforts to apply this principle. May it not be that we hoped to gain thru our faith in the free action of an educated citizenship, an altruism and a sense of obligation to country and to fellowmen which would function in right conduct in all the relations of life, and which we now realize we must gain thru a conscious and deliberate effort of some kind on the part of the schools?

Patriotism doubtless can be taught thru preachment and the symbolism of march and song, but it is at the best patriotism as a sentiment—the kind so much in evidence in our national holidays and at flag raisings—the jingoism so difficult to control when the flag has received an imaginary insult. If we have learned nothing else than self-control as a people from the present European catastrophe, the experience has been of priceless benefit to the nation. We have a superabundance of the sentimental patriotism that is ready to tear to pieces the miscreant who desecrates the flag, or march to drum and fife as devoted but unprepared victims of war to defend our sacred soil from rebel or from foreign foe. What we lack is the patriotism that functions in daily conduct, in the willingness to forego personal interests for national benefit, in the willingness to sacrifice today so that the nation may be prepared for every emergency tomorrow.

Patriotism as conduct and habit cannot be taught by precept and song. You cannot inculcate habit by preachment and proverb. Habit comes as the result of the repetition of acts or thoughts and is to be directed and controlled by drill, discipline and training. We need to get a large portion of our patriotism into the spinal cord as well as the emotions.

The patriotism as habit, which we need to inculcate, is that which has been trained to give in all the experiences and acts and relations of life due regard to the rights and interests of others, to the interests of the country as a whole, and to one's obligation as a citizen to the welfare of his country. This requires a setting up in young and tender years, when habits are forming, of an atmosphere—a point of view which the pupil becomes accustomed to take into consideration when he thinks and feels and before he wills to do. The display of a motto or admonition on the blackboard—even if it be executed in colored crayon, is of no avail. It must be accompanied by the performance of acts from the standpoint of the principle to be inculcated. Here we need,

as in the vocational school, the combination of learning and doing, of theory and practice, of doing and thinking about the doing.

Perhaps this point is well illustrated by the difference between the way in which the American and German schools have taught love of country. In the German schools, the pupil is impressed from the start that the country is everything and he is of importance only as he prepares himself well to serve the Fatherland. "The Fatherland made the home possible in which you have been born and reared. It gave your father the employment by which he has been able to support you. The school belongs to the Fatherland. It is here to benefit you but only that you may become a good citizen and a good worker in some position high or low where you may benefit the Fatherland. Every lesson well done—every act of good conduct is a service to your country—every poor lesson and every misdeed in school or elsewhere is an injury to the country."

What we need to do is not to transplant German schools or German methods to our own soil. Rather do we need to winnow from the experience of their schools all that is good for our social and national

well-being; secure it with American institutions under American conditions and with the application of American ideas; and discard the chaff, if chaff there be. Certain it is that the German schools have many lessons for us as we face, and for the first time in deep seriousness, the stupendous task of securing in this fortunate land a united and efficient and a truly patriotic people.

Democracy's Duty.

We are a people of boundless resources, every dollar of which necessary to equip the schools for the new duties and responsibilities which the best thought of the Twentieth Century is demanding of the schools, should be poured out as the social wealth that rightly belongs to a democracy of conservation. The largest weakness of democracy is that it does not project itself far enough in the future. Amid the free play of thought and action it does not look far enough ahead. We need, above all, a forward-looking democracy that, shedding its perilous optimism, will begin today a many-sided program of preparedness, the most important achievements of which, will come thru the slower but surer work done in the camp of the American schoolmaster.

ANNOUNCEMENT!

The next installment of Mr. Worst's articles on Primary Construction will appear in the November issue of the Industrial-Arts Magazine, ready about the middle of October.

"DIFFERENTIATION IN ART TRAINING TO SUIT INDIVIDUAL PUPILS' NEEDS"

Royal B. Farnum, State Specialist in Art Education, Albany, N. Y.



PRESENT methods in education fall far short of the ideal. In fact they are so antiquated that many educators would scrap them entirely and begin anew.

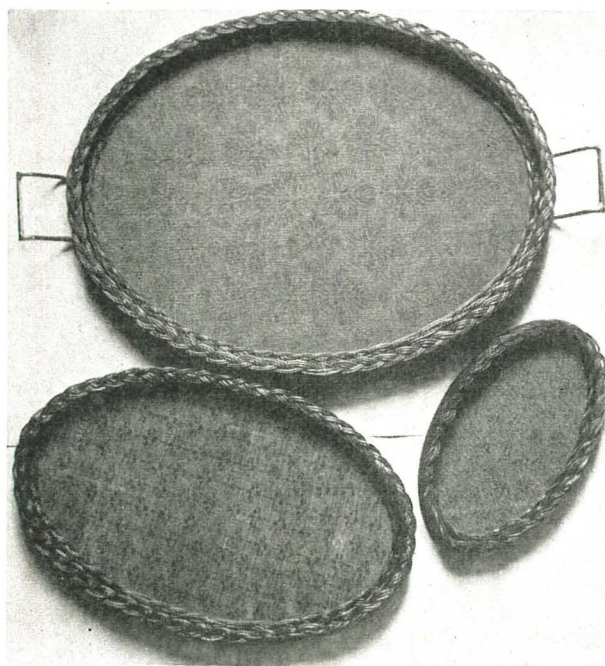
The truth of the first statement is apparent but just where and how the extremist would begin has yet to be explained. Meanwhile many forms of pedagogical training have been instituted to relieve the situation. The general method of procedure, however, has remained practically the same with one striking exception—the kindergarten has cut loose from traditional methods and is solving the educational problem in its own way. At this end of the school line, differentiation to meet the needs of the pupil is actually practiced. One may hear such suggestions as these: "Barbara leads beautifully, therefore, let us have her for our leader in this game." "Betty dances gracefully; see if you can't follow her steps." "Paul can tell stories so well; let us all listen." Thus the individual is led to take conscious pride in his ability and his peculiar talent is carefully nurtured.

The early methods of teaching had for their purpose the storing of information and knowledge gained from books. As contrasted with this aim, we have the ideal purpose of so organizing both mind and body that initiative, independent thinking and mastery of the individual, his acts and his environment, shall result. Examples of these types of education are found today at the extreme ends of the so-called school training: namely, the college on the one hand and the kindergarten on the other. The college still seeks to fill the brain of the individual with specific information; the kindergarten provides every opportunity for the right training of the senses, individual aid and the practical application of the reasoning powers.

My attention was recently called to a situation which illustrates the point. A young girl graduated from the normal art department of a large eastern college. She had her degree, her sheepskin, as proof of her superior knowledge in the field of art teaching; her lecture notes on pedagogy, psychology, and history of education, and her approved outline and courses of study which had been theoretically criticised and were therefore theoretically correct. She accepted a position as supervisor of drawing in a village of 3,600 people. Upon arriving she found that in the high school building, which contained also eight grades, 75 per cent of the school children were foreign. In the only other building devoted to

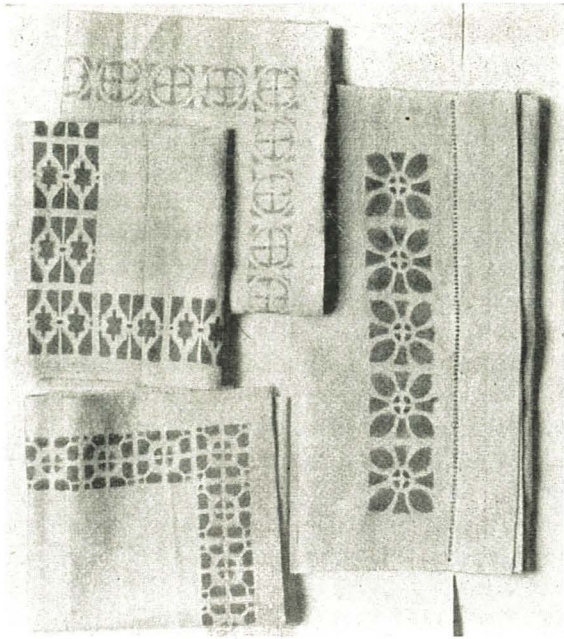
eight grades, she found one hundred per cent of the school population foreign. And to make the problem even more perplexing, she found that most of the children in the first grades could not speak or understand English. These facts the girl failed to realize until after her first month on the college prescribed outline. Then, and then only, she learned how ignorant she was. Mere information was hers, but in the language of the baseball fan, she "could not get it over." And her ability to "put it over" had never been tested in school. Fortunately the superintendent had faith in her. Her youth, enthusiasm, love for the children and charming personality might pull her thru. On the day I talked with her she was quite sure that her four years of college training were four years wasted. By this time, no doubt, some of her professional study has come to her aid, but power of applying her information had never been considered in her training.

Between these two extremes—the college and the kindergarten—we have the primary grades, the grammar grades, the junior high school and the senior high school, and as progress is made away from the kindergarten toward the college, less attention is given to the individual and more to the course of study. This is contrary to the natural growth of the child whose personal and individual characteristics and traits crystalize as he gains in years. If ever attention is to be paid to the individual, if ever



A paper read before the Department of Vocational Education and Practical Arts, National Education Association, New York City, July 7th, 1916.

Stenciling and weaving by pupils in the High School at Fulton, N. Y., under the direction of Miss Nancy Cook. Work based on a Course in Applied Design.



Designs by pupils in the High School at Fulton, N. Y., under the direction of Miss Nancy Cook. Work based on the Home Center.

a differentiation in training is to be recognized, it certainly should come in the more advanced schools. As a matter of fact it should never be lost sight of.

It is strange that the enlightened work of the kindergarten has had no influence higher up. Instead it has been the college which has changed conditions below it to meet its own spirit and thought. Consequently information getting, book knowledge, memory training, is still the backbone of the upper grades and high schools. "The curriculum, the textbook, the examination paper are the most important pieces of the educational machinery," to quote Ernesto Nelson, "and this costly and formidable machinery is not concerned, as one should think it ought to be, with the self-development of the student and the testing of the real progress of his personality, but solely with standardizing, circulating, and testing the amount of information a person has to receive in order to be worthy of the privilege of being educated by the state."

The thread-bare statement that "education is a preparation for life" undoubtedly means that this preparation is for each individual. Unfortunately actual practice has dealt only with groups and there has been practically no individual preparation. In reality every pupil should be given the opportunity to develop within the limit of his individual capacity. Mere book learning and a fine memory will not do. Various forms of activity which will develop such qualities (as yet in the category of the unrated), as love of work, quickness of perception, ability to plan, ability to observe, power to record, ability to discriminate, power to invent, originality of procedure, independence and initiative must become the major plan of the child's education and with such power the book information and *much* more, will become his by his own directed will. Successful ac-

complishment along these lines only should be the test of the child's ability and should, moreover, be the only factor considered for promotion or duration in school.

At present the free action of a conscientious teacher is blocked by dogma, outlines, schedules and examinations. A man or woman of insight and discernment, noting certain characteristics of an individual must avoid their development if such a course does not fall within the prescribed outline. The opportunity is lost and the precious element of greater possibilities, of greatness—is forever lost. There are many, many such flames seeking expression and recognition which are snuffed out by so-called education.

Democracy cannot afford to waste these opportunities sighted from afar, but seldom brought within reach of the individual as he passes thru the years of school life.

The frightful waste indicated by the fact that from 80 to 95 per cent of the pupils entering the primary grades never graduate from the high school, clearly shows that at present our schools are not adapted to the needs of the individual.

What is true of education in general is true also of special subjects. For many years the art and manual training teachers have been so eager in their efforts to present a series of studies in various mediums and tool processes, looking toward a development of unapplied knowledge that they have completely lost sight of the pupil.

Turning back but a few years in the history of our art and manual education we find lessons, exercises and outlines seeking to fulfill the requirements of a course of study based upon a series of models. Borders, historic ornament, perspective and object drawing, planed blocks of wood, joints, sleeve boards and coat hangers have been given to all with utter disregard for the character of the community or the individual. New things had been introduced because some one had offered them with some degree of success. But the new things were adopted bodily and transplanted without regard for the new conditions.



Work based on a Course of Advanced Representation by Ruth Beardsley of the High School at Dunkirk, N. Y., under the direction of Miss Mary E. Goodell.



A time sketch from the Erasmus Hall High School, New York City, under the direction of Allen B. Daggett. Work based on a Course in Sketching.

The common procedure of the community or the individual is to first do the thing which someone else did, in just the same way. And in turn when that community or individual discovers or evolves a new thing, the same tendency leads others to copy both the idea and its operation. Thus you may find in Ohio a strictly New England town but lacking the New England environment; so we brought sloyd from Naas and established it in a foreign soil without consideration for a different people; and so we find in the art field so many places which are stamped Teachers' College, The Art Institute or the School of Fine Arts.

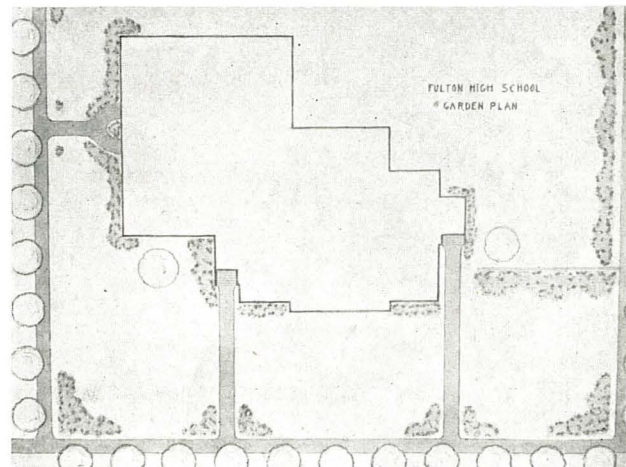
The wise physician never prescribes without first understanding the condition of the patient. But our earnest supervisor will offer wherever she lands, the same story she learned at school. I recall vividly the answer returned to me when I questioned the advisability of offering a certain kind of work in a certain way to a normal high school. "But how can one do otherwise," the teacher replied with a tone of finality, "after having studied with Mrs. Green?" Here, she implied, was the panacea for all pupils wherever they may be, for that was what Mrs. Green and the school taught.

For many years art education in New York State had been forced into the pupils in just this way. State syllabuses in drawing for elementary and secondary schools were published at intervals of five years. Based upon these state examination papers, outlines were issued twice a year, and the suffering individual, no matter what the ache or pain, was tested not on his native abilities, but on his knowledge of the syllabus as interpreted by his teacher. When great numbers gave the same answer in the same way, the syllabus was acclaimed a success. When individuals showed real intelligence and treated the question in a distinctive way, they were failed and were given the prescribed dose for another term.

Continued results under this wholesale treatment failed to record progress. Changes made in the syllabuses introduced new problems, added in exactly the same way that outside supervisors were teaching them. This brought even more retarded progress, for it meant more information to remember in order to pass the dreaded test.

It was imperative that steps should be taken to relieve the situation. Why, in the first place, should a school in an industrial community be compelled to pass the same examination as a school in a farming district? Here was the crux of the whole problem. No differentiation of work had been permitted to suit the communities' needs.

The situation just cited is, no doubt, peculiar to the Empire State, but it is indicative of what happens in cities themselves where there are many grade schools and two or more high schools. Too often allowance is not made for each school's environment and its own peculiar conditions. The same set of problems will never do in our cosmopolitan municipalities. The Polish district presents very different conditions from the Hebrew, the Italian, the Negro, and the Yankee districts. As the conditions are different, so the demands for art training



Work based on a Course in Garden Design. Developed and executed on the grounds of the High School at Fulton, N. Y., under the direction of Miss Nancy Cook.

are correspondingly different, and every effort should be made to meet these demands.

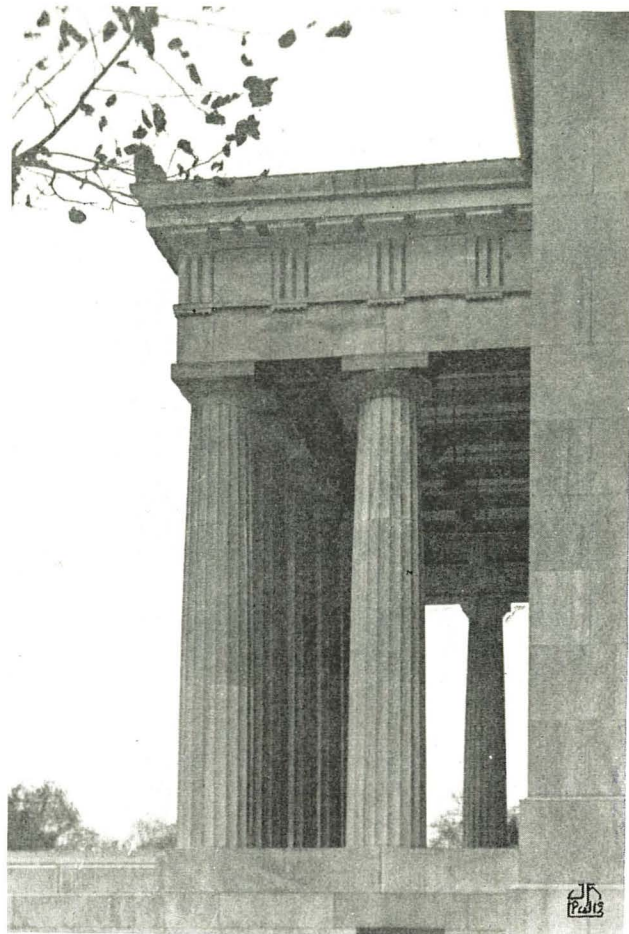
Reference again to New York State may serve as an illustration in point. To alleviate the plight in which art education found itself it was necessary to take heroic measures. The number of examinations was therefore reduced from nine to three. Schools were now permitted to offer advanced courses to suit their local needs, subject to state approval. Each one of the one thousand or more high schools might offer any one of a number of courses according to the demand of the community, and the facilities for handling the subjects. The syllabus was again revised and the so-called elementary design in the high school was grouped under four centers; the commercial center, the industrial center, the home center and the personal center. Thus a school had a much wider latitude in which to work and might adapt its art teaching to an apparent need.

This solution of a state's problem, where state credits are earned, is again similar to the city's problem where school credit only is required. Differentiated courses for the different schools in a city is no less essential than differentiated courses for the schools of a state. In two years marked progress in the state work is apparent. In place of nine different courses, including mechanical drawing, previously offered, there are now 26 different courses, including such subjects as charcoal drawing, water color painting, sketching, costume design, metal and jewelry design, landscape design, ceramics, book-binding, history of art, etc., with practical application in the different mediums. The illustrations show products of these adapted courses.

What is true with regard to art education in states and cities is no less true with regard to schools and pupils. The individual pupils have their own environments, and more, they are growing personalities with distinctive characteristics and with native abilities. How much more imperative it is, then, that we should differentiate their training to suit their special needs!



A sketch made by a pupil of the DeWitt Clinton High School, New York City, in the Metropolitan Museum. Work based on a Course in the History of Art. The course is under the direction of Miss Jessie H. Bingham.



A page from the note-book of John Lewis of the Lafayette High School, Buffalo, under the direction of Miss Elizabeth Weiffenbach. Work based on a Course in Art Photography.

The present system is like that old state syllabus. All pupils get the same thing topped off with the same test. One may go into most any schoolroom and find, if it be the month for that work, forty pumpkin borders from forty different children, each border having the same number of silhouette pumpkins drawn the same size, in the same way, upon panels of the same kind of paper, and each paper measuring exactly three by nine inches. Next week, of course, we may find autumn leaves or black cats, but the sameness is there. Some teachers, it is true, can make drudgery a delight, which often saves the child, but that outline must be followed at any cost and in spite of what the youngsters actually want. One may say that the picture is overdrawn, but an analysis of the course of study itself will show how the individual is left out. The average outline for the elementary grades is divided for each year into the same number of parts under similar heads. It is a four-ring circus. Simultaneously in each grade there is the fall nature drawing, then the holiday construction, followed by the winter illustration and object drawing, and ending in spring with nature and design. Each autumn Tommy is brought back to his fall nature with a surprised jolt. Where had he seen those things before! Years ago, surely.



Leather Work—by pupils in the High School at White Plains, N. Y., under the direction of Miss Jenny Clark. Work based on a Course in Applied Design.

It is so with each of the other topics. There is no continuity of work. Between each jolt it is one long, long intermission. Meantime if Tommy shows ability in construction, even originality, his enthusiasm is quenched when the outline demands that he play in the next ring. Is it little wonder that some Tommies rebel, that they are real terrors, and that others are called dull?

In a third grade of a school in this state, a young man of this "imp" class held sway. He was literally a chronic pest. He couldn't compass his studies, he wouldn't sit still and he upset the whole class. Picking out his most humane teacher of the primary grades, the wise superintendent transferred her to the school where Michael Slavosky was the terror. This teacher had repeatedly heard wild tales about this class and now was most anxious to discover the reason for its reputation. She first found that practically nothing had been given to the pupils to keep them busy, consequently the first teacher had been compelled to spend most of her time pacing the aisles to keep order, incidentally hearing the book lessons. Next she found that there had been no attempt to arrange the seating of the pupils with regard to their size and appearance. Therefore she found Michael, an overgrown, awkward boy, in the front row, ever conscious of his position. Her first step was to honor Michael with a rear seat. This was followed by other shifts and then clay was given out, by Michael. The children were told to make anything they pleased, while the teacher took count of stock and studied the class.

She found, as usual, that each child was different from his neighbor and would require some individual treatment, but as a whole it was an average normal group of boys and girls with one exception—Michael Slavosky. His case, therefore, must receive more than average attention.

Calling in the clay work, Miss C. found that Michael had modelled a very good and a very fat pig. Commending this effort, before the whole class, she questioned. "And, Michael, how did you know so much about pigs?" With a burst of pride and a scuffle of feet he replied, "I got one." From that time on the boy kept modelling pigs, but somehow couldn't seem to make a success of anything else. Miss C. was about to give up when one day Michael, with a very sober face, brought to the desk an extremely dirty dough pig. "Why Michael," she exclaimed, "Why did you make him so thin and queer? He looks sick." Whereupon a great sob came forth, and with tears streaming down his face, Michael said, "He died last night." With a start of surprise the teacher gave closer attention to the model. If a boy of 9 could tell the story so well, in dough, there must be greater possibilities of further development.

Shortly after this she had Michael transferred to a school for backward children, on one condition, that he should always have within his reach some modelling clay.

For the next three or four years, Michael plodded, with varying success and some gain, thru the usual three R's, but always with his clay at hand. In this medium he developed rapidly. Both the principal and the supervisor encouraged it and he at once became the pride of the school. It was finally decided that further study of the usual school subjects could not help the boy materially and he was allowed to work as a general helper in the studio of a New York decorative sculptor. Here was the home of his dreams and in a remarkably short time he was recognized as the best apprentice in the studio.



Embroidery—in some cases beaded—by pupils in the High School at Geneva, N. Y., under the direction of Miss Carrie Harmon. Work based on the Personal Center.

Thus thru a differentiation of training to suit an individual's needs, a backward, "terror of his class" found himself.

One other illustration. A boy with exceptional talent in drawing was encouraged to attend a Latin high school. In this particular school there was no art department, in fact, as he soon learned, nothing to appeal to his creative instincts. Therefore high school was a failure. A three-dollar-a-week bank vacancy was offered and accepted. The boy, however, could not keep from drawing. Gradually he accepted commercial work and spent his evenings drawing and studying. Meantime he received a number of promotions in a larger bank. This and his marriage led him to the unhappy conclusion that banking, which, tho not positively distasteful, but by no means a joy to him, was to be his life work. Yet he kept on drawing. He couldn't help it. Commercial work continued to come his way. His work became known and at last came the great day when he must finally decide to either refuse the outside art work or give up the bank. When last I talked with him, he had taken the step. He had all he could handle of commercial designing and was on the art staff of the Youth's Companion.

The art student would call him successful and yet his growing regret is that he was allowed to go for over thirty years with no attention paid to his



China Decoration by pupils in the Academy of the College of Mt. Saint Vincent, N. Y. State, under the direction of Sr. Mary Patrice. Work based on the Home Center.

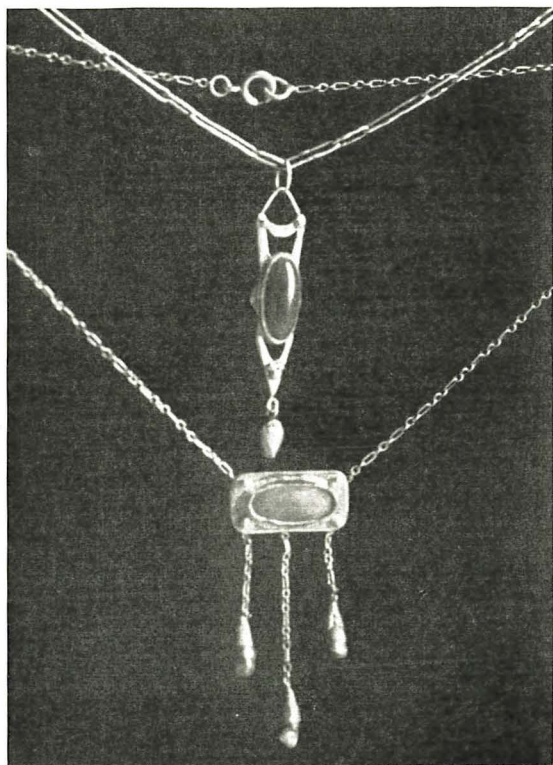
individual need. He is called self-made, but his handicap can never be overcome. He will go farther, but the pity of it is that the early years upon which the future is built are lost and he will never rise to the heights of which he was capable. He knows it now, when it is all too late.

Every art teacher has the opportunity of making great some individual. Differentiation in the training is all that is required. To accomplish this every art course should be elastic. Principles and elements of beauty will remain the same, but the outlet for their expression may vary with the individual. It is necessary then, that a teacher be familiar with many mediums and their applications. Pupils should be studied and their native characteristics encouraged.

In the grades a departmental teacher should foster the early tendencies of the individual. As he progresses one of two courses should be pursued. If he shows technical ability, this side should receive emphasis; if he lacks special talent, a good eye and hand training should be followed by emphasis on the side of appreciation.

The talented one should be carefully watched for creative tendencies. Is his interest in drawing, designing, painting, modelling or other constructive work? Again his special aptitudes and interests should be encouraged, without neglect, of course, to proper execution, and as he proceeds full sway should be allowed his greatest gift. His high school course thus becomes pre-vocational and he is readily able to choose his future course in the normal or professional art school.

I realize that there are physical drawbacks to these ideal statements, the least of which is the problem of the large class. But schools are not factories, or they should not be, and factory methods should not prevail. It is by striving for the ideal that we approach it and differentiated art training to suit the individual pupil's needs is an ideal to be striven for.



Products of a Course in Jewelry by pupils in the High School at Geneva, N. Y., under the direction of Miss Carrie Harmon. Work based on the Personal Center.

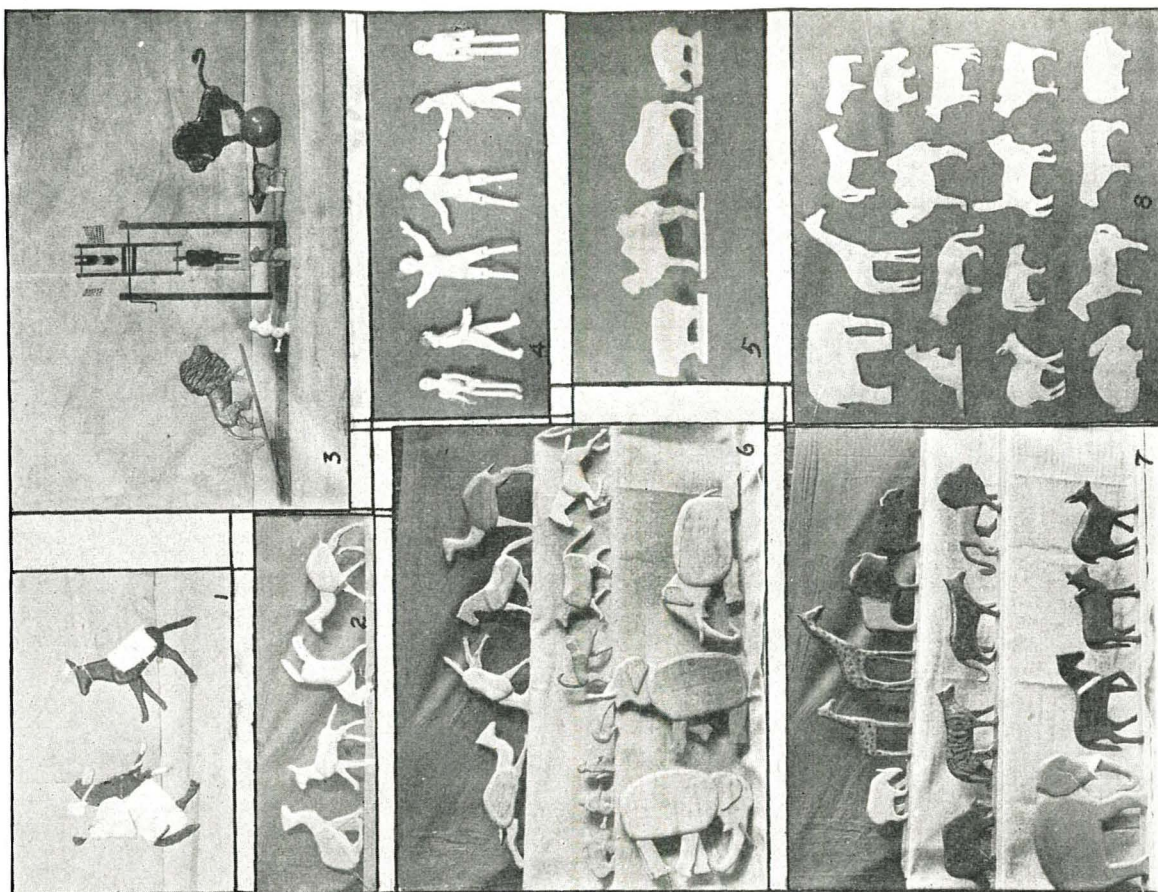


Plate II.

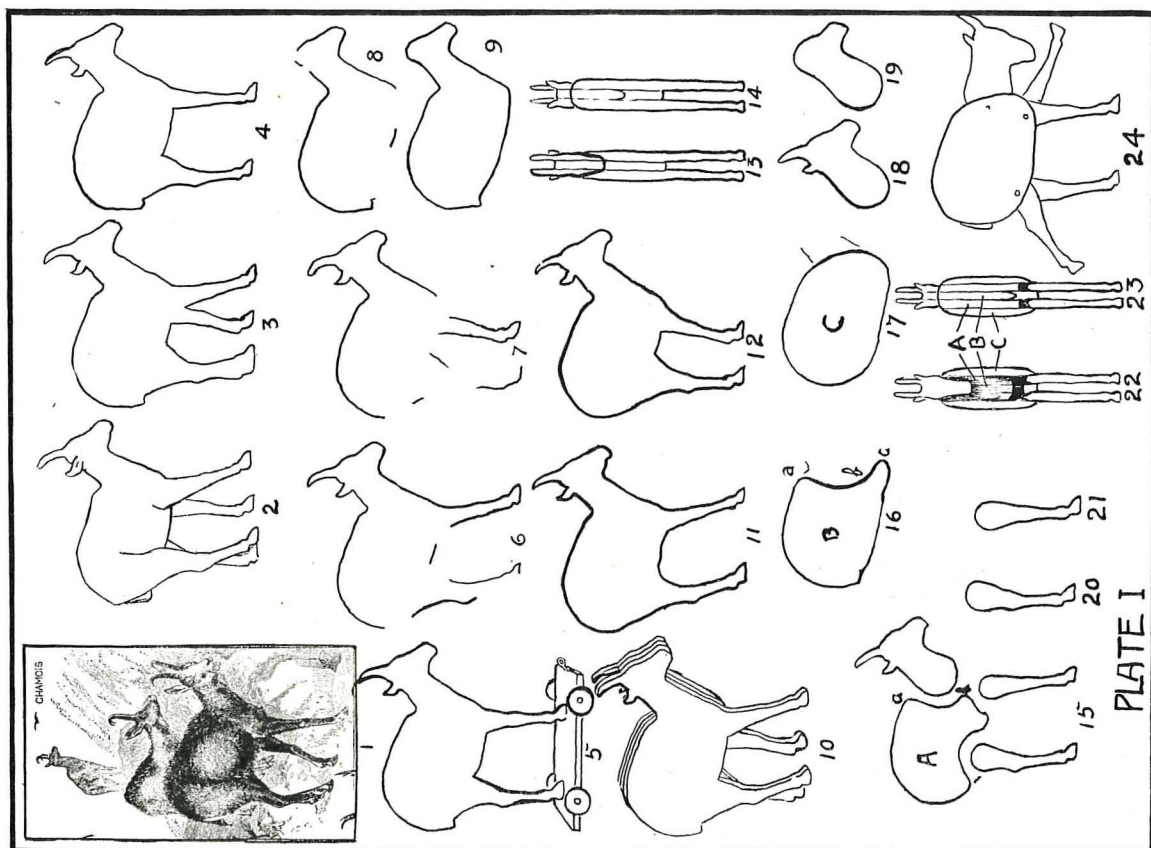


Plate I.

THE TOY CIRCUS

B. F. Larsen, Provo, Utah



THE time was when Circus Day, with its noisy display of harsh music and cruel color harmonies disturbed the peace and quiet of regular school work. Teachers worried and fretted because pupils were restless and unruly. How could children study and recite properly when billboards and fences were decorated for weeks with such grotesque pictures?

The time has come when teachers welcome circus day. It offers rare opportunities for vitalizing school life. The sound of the approaching parade is the voice from another world with a thousand mysteries. The strange noises coming from the animal cages excite our interest in the wonders of the great creation. The queer people in unfamiliar costumes give us a better acquaintance with the world outside our own native village. For days the teacher has been preparing for this event. The children have been comparing poster pictures with descriptions in their geographies. They have been searching the school atlas; they have been learning how to use the encyclopaedia; they have been having an unusual amount of *real* oral expression and doing some writing; they have learned how to spell a few new words.

When the big day comes, the pupils are dismissed for a few hours. They are armed with pencils, papers and cameras. They see the wonders of the circus and record them. They come back to school alive.

Circus day as a part of the public school is equaled only by giving the children an opportunity to build and operate a circus of their own. The project may be adapted to any grade in the elementary school. Besides furnishing motive for the study of language and geography, it enriches the drawing course. When pupils draw with some purpose which is related to their desires they surprise you with their ability to draw.

The horses and possibly some other animals may be drawn directly from nature. For patterns of wild animals from other lands we must depend largely upon photographs. If the pupils have taken the photographs themselves the work will be doubly interesting.

Fig. 1, Plate I, is a picture taken from a geography text. Fig. 2 is a drawing made from this picture. The drawing appears awkward because the four feet have been drawn on a level. This required a modification of the original picture. The head should also be modified to give a simple profile. With sharp scissors cut on the outline of this drawing, Fig. 2, and trace as in Fig. 3. Now modify the legs so only two are seen. See Fig. 4. This is a valuable drawing exercise which grammar grade pupils soon learn to enjoy.

By cutting out Fig. 4 we have a pattern which may be traced onto thin, soft wood and cut with the coping saw into a real animal. The animals shown in Fig. 8, Plate II, were made by first-grade children from patterns furnished by higher grade pupils. These animals may be mounted like those in Fig. 5, Plate II, by standing each on a small block and marking around the feet, so one can tell where to place the nails. Drive a long brad thru near the heel of each foot, invert the block and press the animal carefully onto these brads, forcing them into the legs. If the brads are too near the front of the feet they will split off the toes. Large wooden buttons, purchased in any dry goods store at five or ten cents per dozen, may be nailed onto the block for wheels and a screw eye put into the end for the attachment of a string. (See Fig. 5, Plate I.) The wheels may be sawed from thin wood and the centers taken out with a gimlet or small drill. I have found large headed lath nails quite satisfactory for attaching wheels.

If a more elaborate animal is desired, trace the cut out pattern (Fig 2, Plate I) in three parts. Fig. 6 is the right side of the animal, Fig. 7 the left side, and Fig. 8 the center. These drawings must next be completed like Figures 11, 12 and 9. Cut out and trace each pattern once on the wood. Be careful to trace the legs and horns with the grain of the wood. The three parts cut from wood may be assembled like Fig. 10, and fastened with glue and three or four half-inch brads. The animal should then be placed in a vice or clamp and left until dry. We have tried cutting animals from solid blocks but find that the three-piece method is very much easier. When the parts are assembled the real test of skill begins, for the crudity or perfection of the animal depends upon the maker's ability to carve, file and sandpaper. Trim the rough edges off with a sharp knife. Round down the back, carve out the nose and head and shape the joints and muscles of the legs. (See Figures 13 and 14, Plate I.) A small wood file or shoemaker's rasp can be used advantageously before sandpaper is applied.

Now comes the painting which is one of the most interesting steps in the whole process. Pupils may trace their patterns on drawing paper and spend some time in color study, probably fitting in several outlines with water colors before attempting the use of oils. Purchase several ten-cent cans of good paint. Red, yellow, and blue with white and black will possibly be enough. Mix in small quantities if you have several kinds of animals to color. The colors will have more life if they are not mixed too much. All of the cage animals and as many of the others as

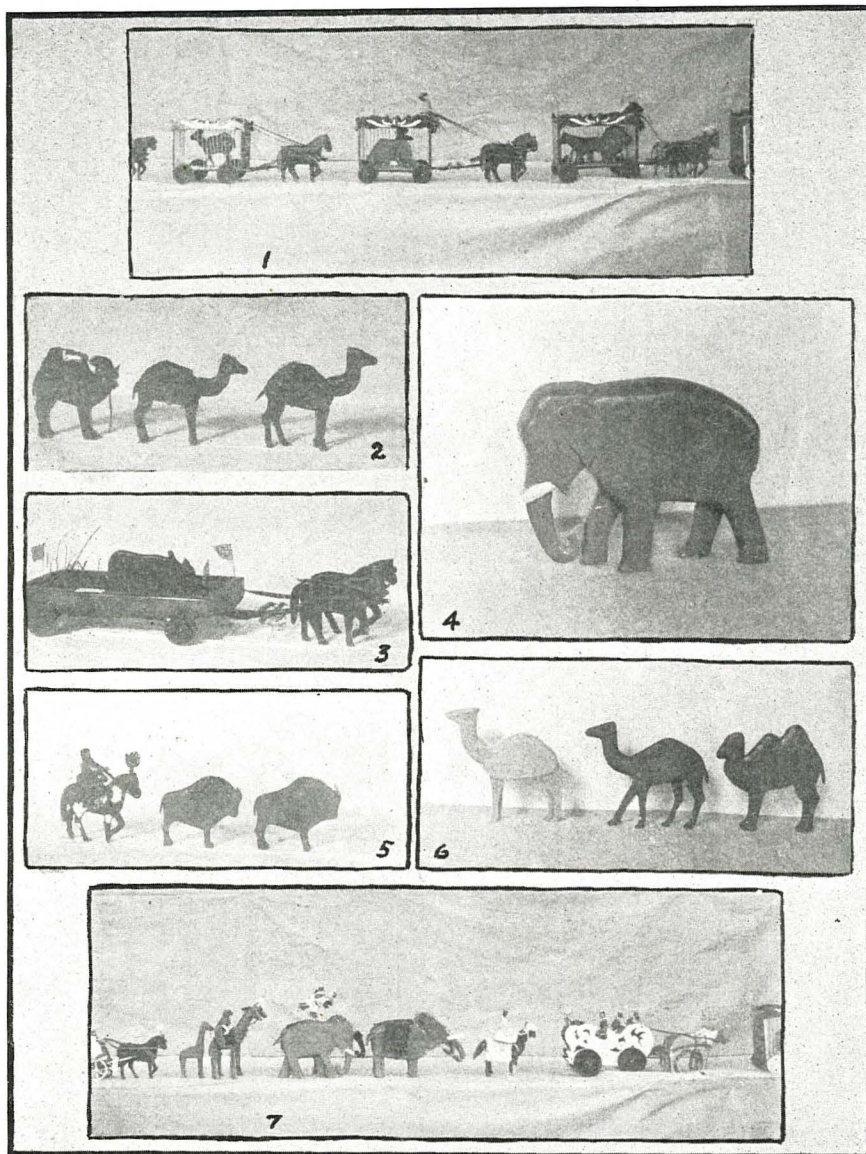


PLATE III.

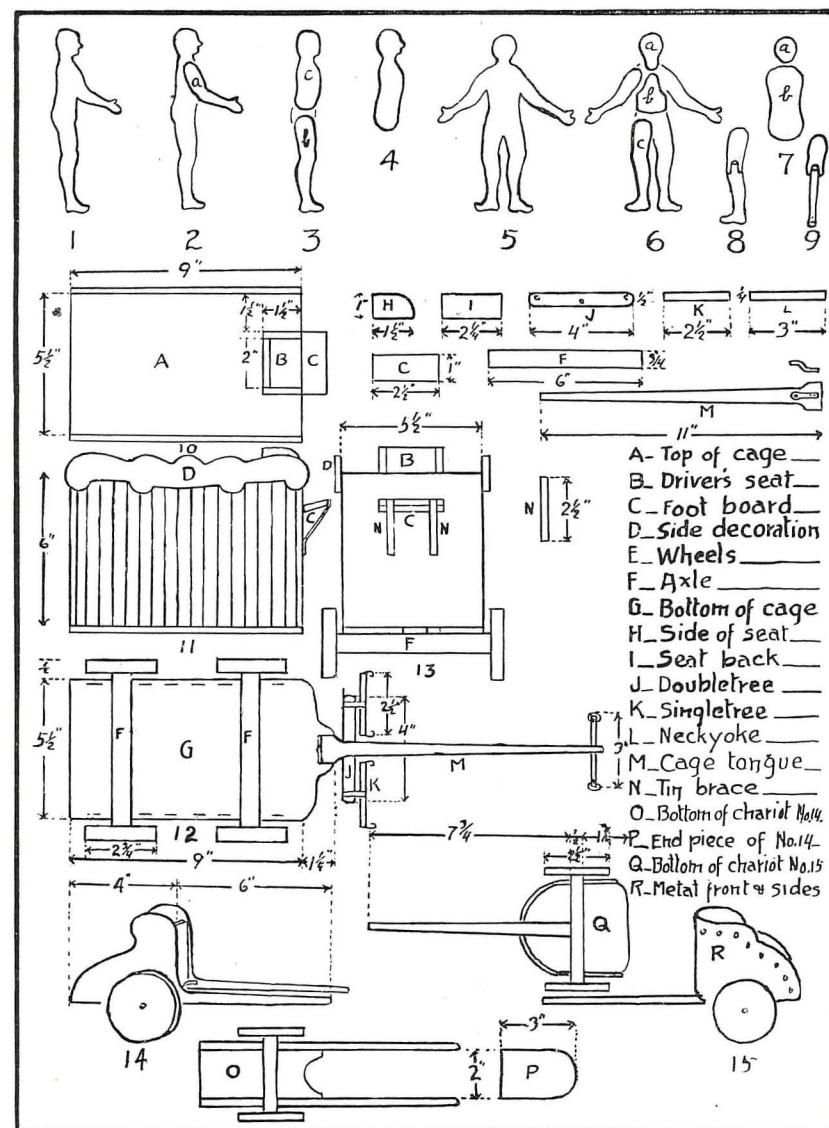


PLATE IV.

desired, may be made by the method just described. (See Plate III and Fig. 7, Plate II.)

The animals used for ring performances are more interesting if they have movable heads, legs and tails. (See Figures 1, 2 and 6, Plate II.) Our most successful trick animals are made with five pieces for the body besides the movable parts. (Trace the outline of Fig. 4, Plate I.) Then separate the head, legs and tail by rounding them into the body as in Fig. 15. Cut out parts as indicated by continuous lines. Next trace Fig. 4 twice without head and legs as in Figures 16 and 17—the tail being drawn in connection with Fig. 16. Cut out A, Fig. 15, and lay on B, Fig. 16, and trace the line ab, then complete to c. Draw Fig. 17 as indicated in the diagram.

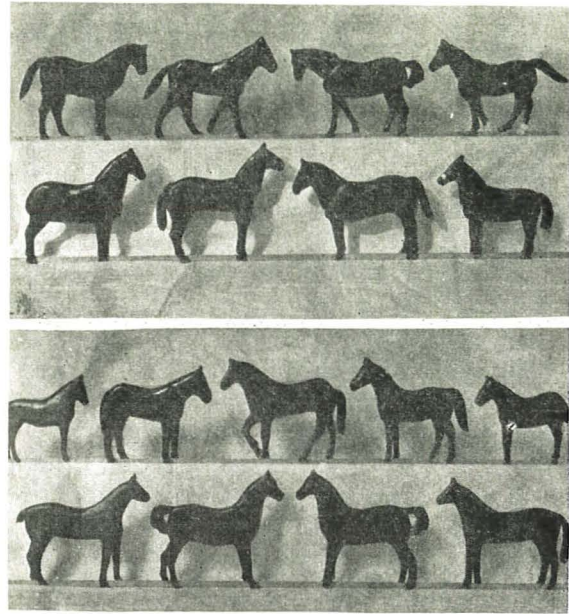
Trace and cut out from wood, two pieces of A, one of B and two of C. Make two parts of the head with horns and ears, Fig. 18, and one without horns and ears, Fig. 19. Make two of Fig. 20 and two of Fig. 21 for legs. Glue A, B and C together and the three parts of the head, as indicated in Figures 22 and 23. Carve and sandpaper as directed above and fasten movable parts to the body with brads. (Fig. 24.)

The animal may be painted after assembling but we have been more successful by painting before the legs, head and tail are fastened to the body.

Jointed people make the circus more interesting. Draw a simple figure, Plate IV, Fig. 1. Cut out from paper and trace from this pattern Figures 2, 3 and 4. Extend the outline of the arm, No. a, Fig. 2. This, when cut out, serves as the pattern for the movable arm. The leg b, Fig. 3, is secured in the same way. The body is made in three parts; Fig. 4 is the center, and c, Fig. 3, goes on each side. See Fig. 4, Plate II.

Figures 5, 6, 7, 8 and 9 represent the construction of wooden figures with right and left movements. If joints in the knees are desired, cut as shown in Fig. 8 and assemble as shown in Fig. 9. Pins or small brads may be used for fastening heads, legs and arms, to the body. We have been more successful, however, by drilling small holes and riveting with malleable wire. Observe central figures in Fig. 4, Plate II.

See Plate IV for construction of cages and chariot. The drawings are merely suggestive. The cages should be constructed to fit the animals which are to be housed in them. Each cage is a simple box having the open sides laced with thin wire. Wheels,



Above: Jointed Horses made by fourth grade pupils for their circus.
Below: Horses made by the three piece method.

seat and decorations may be added to suit conditions. Paint the inside some light color which will show the animals to good advantage. The outside may be painted with a darker color and trimmed with light.

The costumes and draperies are an important part of the successful circus. We encourage the children to bring to school small pieces of waste silks, satins, velvets, trimmings, and any interesting cloths or strings which mothers are willing to contribute from their remnant bags. These pieces are put together, then sorted and used as needed when the various characters are dressed.

The harnesses are made by cutting strips of leather and fastening them to the horses with small shoe tacks.

Our results have been better when we let each child choose the construction of the particular part of the circus which was of most interest to him. One boy assumed the construction of Buffalo Bill and his animals. Another pupil supervised the construction and operation of the dog show. The emigrant company was brought into existence by another, while the Indian camp was made by still another. Certain pupils invented various pieces of ring apparatus.

The pupils purchased their own materials and assumed complete ownership of the things which they made.

“The reward of a thing well done is to have done it.”

Emerson.

ELECTRIC MOTOR WITHOUT CASTINGS

Fred B. Wall, New York City



AFTER looking in vain for a small electric motor which could be used in elementary manual training work and which had certain qualities such as low cost, in fact a real motor which could be made by a boy of eleven or twelve, an effort was made to make one from ideas which had been accumulating for some time. No claim is made for originality in any of the several ideas involved, but from the assembling of these ideas the motor has come into existence. It will be noticed that unlike other motors, which were recently described in the *Industrial-Arts Magazine*, this motor requires no castings.

Some teachers say that they would rather rush the work and have time at the end for the pupil to "tinker" with the motor or engine and make necessary adjustments in order that he might get the most from the study. This is good logic, but it has been tried, and as a result the pupil has fooled with his machine for several lessons and finally the teacher has had to step in and do the adjusting. What did the boy gain by this? Nothing. Instead of conquering he has been conquered. If a little more thought had been given to details and workmanship the machine might have started whizzing the first time power was applied. The pupil would have had the feeling and spirit which comes by conquering and I doubt not he would have gained as much if not more than by the method generally used at present.

The motor, of which the method and specifications for making are given below, was worked out with the idea of involving neatness and good workmanship.

Stock per Pupil.

Field Magnet.

Iron strips.....1 piece $\frac{3}{8}$ "x $\frac{1}{8}$ "x11"
Iron gas pipe for core.....1 piece $\frac{1}{4}$ " I.D.x1"
Iron rod for rivet.....1 piece $\frac{3}{16}$ "x1 $\frac{1}{2}$ "

Fibre Washers.

For magnet core.....2 pieces 1 $\frac{3}{4}$ "x1 $\frac{3}{4}$ "x1/16"

Armature.

Venetian iron.....1 piece $\frac{3}{8}$ "x17"

Commutator.

Birch dowel.....1 piece $\frac{7}{16}$ "x $\frac{5}{8}$ "
Brass tube.....1 piece $\frac{7}{16}$ "x $\frac{1}{2}$ "

Shaft.

Brass rod.....1 piece $\frac{1}{8}$ "x4"

Bearings.

Brass strip.....1 piece $\frac{5}{8}$ "x1/16"x8"

Brush-holder Arm.

Fibre.....1 piece 2"x2"x1/16"

Bolts and Nuts.

Brass.....3— $\frac{1}{2}$ "x
Brass binding post.....2— $\frac{3}{4}$ "x

Wire.

D. C. magnet wire for field.....30' No. 18
D. C. magnet wire for armature.....16' No. 22

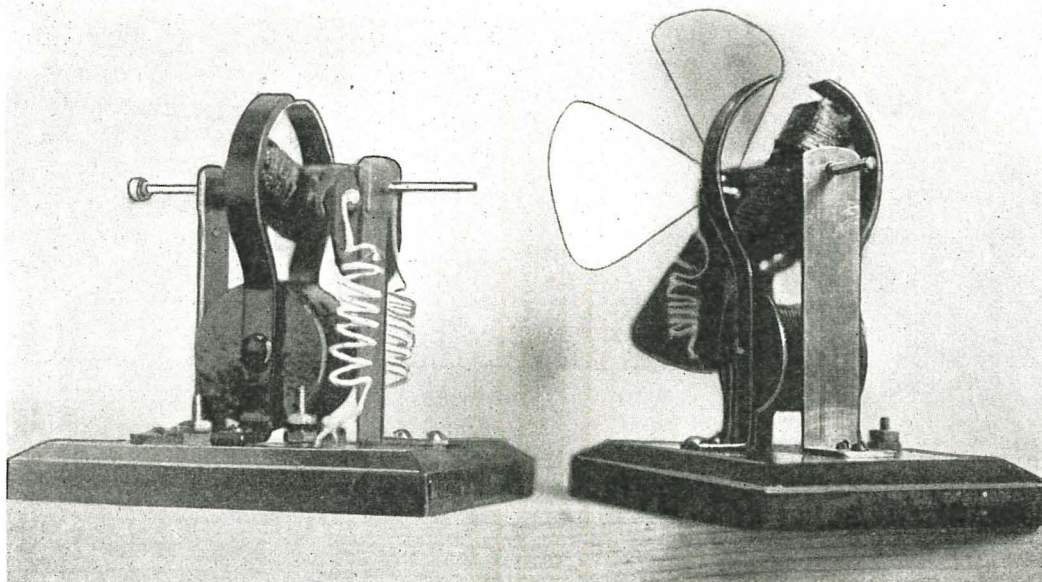
Base.

White wood.....1 piece 3 $\frac{1}{2}$ "x5"x $\frac{5}{8}$ "

Equipment—(Special).

Drills.

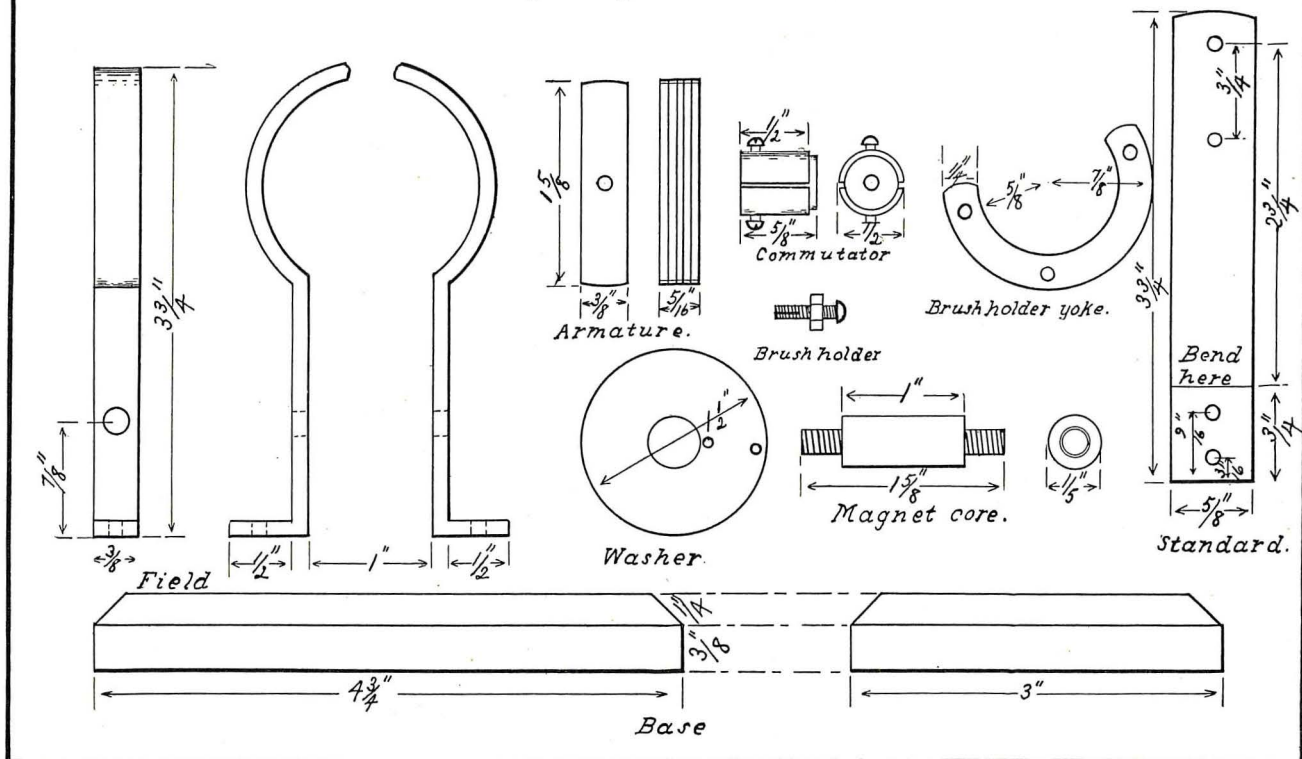
$\frac{1}{8}$ " drill for holes in base of field and bearings.
 $\frac{5}{32}$ " drill for holes in receiving brass machine screws.



TWO OF THE MOTORS MADE BY THE AUTHOR'S CLASSES.

Electric Motor.

Designed by Fred B. Wall, Jan. 1916,



$3/16"$ drill for field magnet core.

No. 31 drill for shaft.

Bit.

$7/16"$ used to bore holes in core washers.

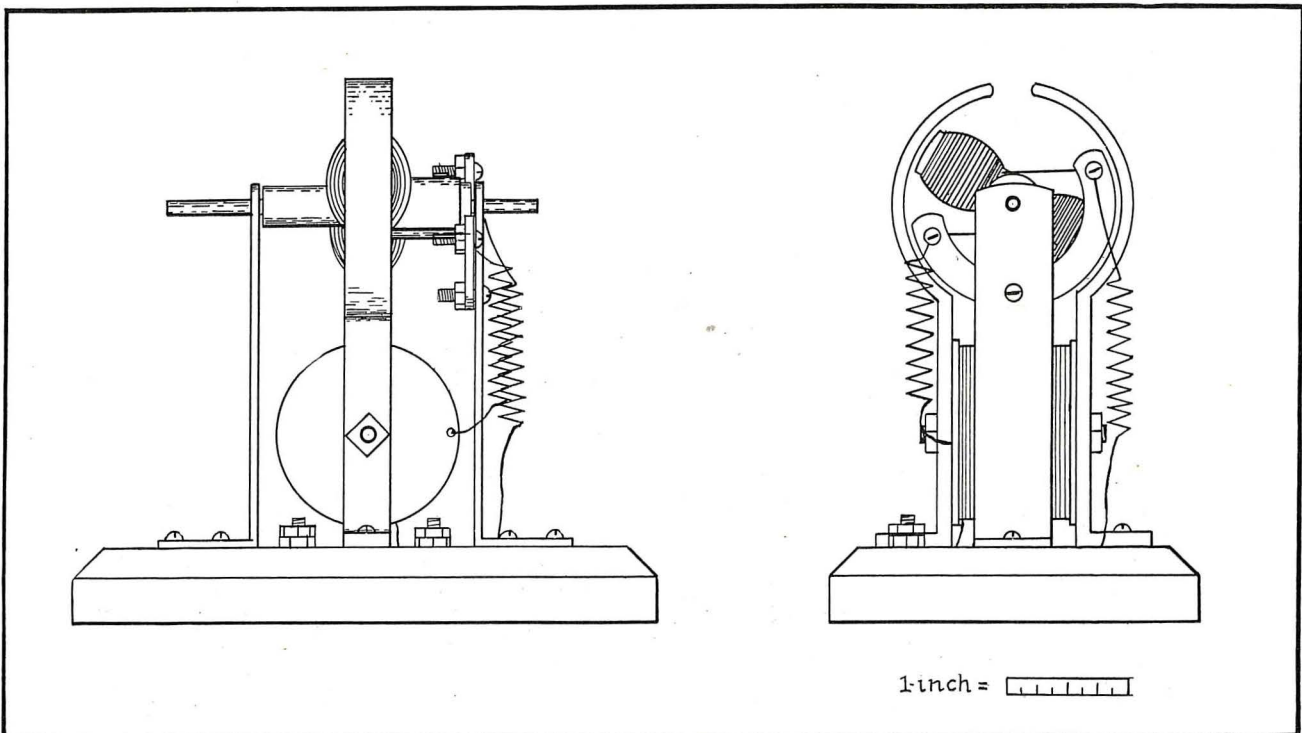
Pipe.

One piece $1 3/4"$ O. D. pipe to bend field magnet.

Method.

Field.

1. Bend iron strip half around pipe.



DETAILS OF ELECTRIC MOTOR.

2. Place one-inch block between ends and press together in vise.

3. Make necessary measurements and turn field upside down in vise.

4. Bend ends back at right angles to form feet.

5. Drill necessary holes for screws and magnet core.

6. Saw off one inch piece of gas pipe and file ends to make them square.

7. Saw off $1\frac{1}{2}$ " piece of $3/16$ " iron rod.

8. Rivet field together, using the iron rod for rivet.

9. Saw $\frac{3}{8}$ " opening in top.

Armature.

1. Cut Venetian iron strip into ten pieces each $1\frac{1}{2}$ " long. (The drawing shows but five.)

2. Drill $\frac{1}{8}$ " hole in center of each, being careful to make accurate measurements.

Shaft.

Saw off from $\frac{1}{8}$ " brass rod 4" piece.

Bearings.

1. Drill $\frac{1}{8}$ " holes as shown in drawing.

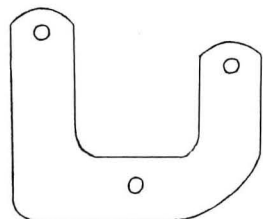
2. Place both together so that holes for shaft are exactly even.

3. Clamp in vise so that $\frac{3}{4}$ " of lower part shows above vise jaws.

4. Spread apart and hammer down flat.

Brush-holder Arm.

Cut from fibre as shown in sketch. Drilled



with right size drill to receive brass machine screws.

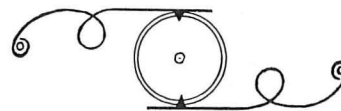
Brush Holder.

Two $\frac{1}{2}$ " brass machine screws or bolts. For

flat brushes saw cut $\frac{1}{4}$ " deep lengthwise the screw. For wire brushes no cut is necessary.

Brushes.

Flat copper or copper wire.



Magnet Coil Washers.

1. Draw a circle $1\frac{1}{2}$ " in diameter on the fibre.

2. Bore out the centre with bit.

3. Cut outside to the line.

4. Cut open one side so that it may slip over core of field magnet.

Windings.

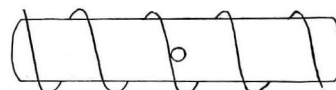
1. Wind field and armature evenly and with care.

2. Both poles of armature are to be wound in same direction.

Commutator.

1. Saw off $\frac{1}{2}$ " brass tubing.

2. Drive in $\frac{5}{8}$ " piece of dowel.



3. Drill $\frac{1}{8}$ " hole in centre.

4. With hacksaw, saw tubing lengthwise on opposite sides.

5. Remove pieces and glue on securely.

To Assemble.

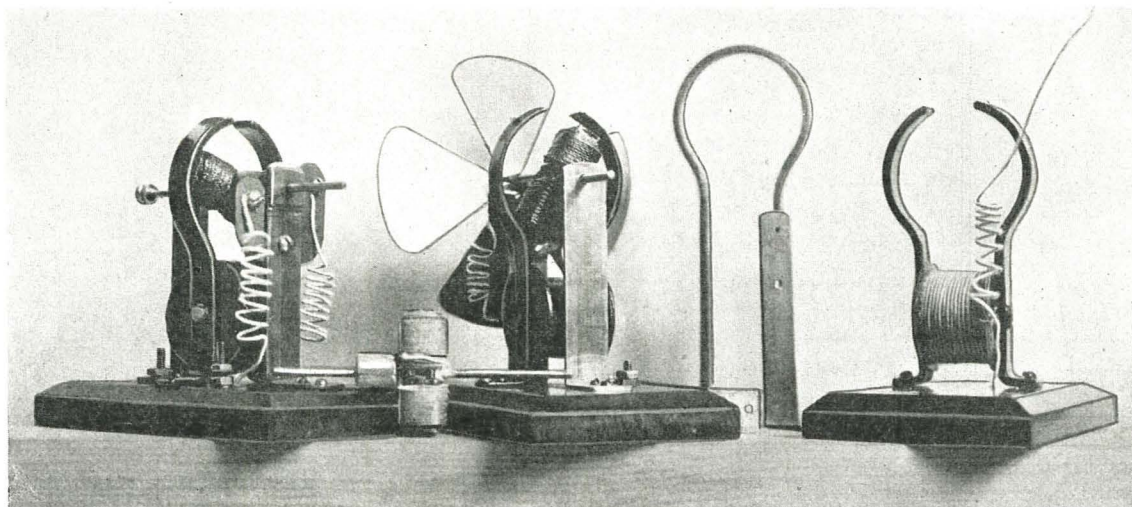
1. Solder armature on to shaft and wind.

2. Solder ends of armature wire to commutator.

3. Run one end of field winding to binding post and the other end to brush holder.

4. Run a wire direct from other binding post to opposite brush holder.

A coat of cardinal red enamel for the field magnets and black shellac for the windings will improve the appearance of this motor wonderfully.



MOTORS MADE BY THE AUTHOR'S PUPILS.

A PRACTICAL OUTLINE FOR CO-OPERATION BETWEEN THE ART AND MANUAL TRAINING DEPARTMENTS

C. E. Howell, Director Mechanic Arts, Public Schools, Decatur, Ill.



CO-OPERATION between public school departments is one of the theoretically desirable, but practically difficult, problems of today. To secure a tangible working basis which shall prove a help to all subject factors involved and a hindrance to none is no small task. It is undoubtedly due to these reasons that actual co-operation is still lacking in so many schools.

The following outline presents a scheme for the Art Department and the Manual Training Department which has been successfully used in one city system. It is simple, clear-cut, and definite, three very essential points in any such plan.

Of course the thing which we (the manual training teachers) wanted of the art department was to have them in some way influence and control the decorative and outline designs to be used by the grade boys in our shops. We recognized that the ideal conditions would be those in which the art teachers would have a real knowledge of the materials used in our shops and their limitations from a practical standpoint. But, since the chances were few that they would have this knowledge—indeed we knew that most of them did not—it became imperative that we should hit upon some scheme which would pre-determine certain of the structural characteristics and yet leave the more artistic features open to originality.

It may be well for me to mention here that the drawing teachers insisted they were already teaching design of the kind we wanted and objected somewhat strenuously to an innovation which meant some added work for them, but happily we had a supervisor who saw the value for her own work as well as ours and pushed the thing thru to a successful trial.

Certain of our exercises for the grade shops are absolutely fixed, that is, they are blueprint models taken without change from the mechanical drawing, every slightest detail being definitely pre-determined. Others are only partly prescribed, a wealth of detail, and particularly design, being left optional. Still others are entirely open to selection, not only as to detail, but as to the object to be made, subject, of course, to the approval of the teacher.

It was at once evident that co-operation was in no way concerned with the first class, but must be confined to the two latter, with the middle class getting the largest share of attention in proportion as it occupied the largest place in our shopwork.

We wanted the outline to be brief, compact and definite. At the same time it had to be capable of being reproduced in large enough numbers to furnish

at least one copy for each teacher and that at a minimum cost. A blueprint would have been expensive from the standpoint of time consumed in the original tracing and the cost of the copies. Then, too, we were afraid that anything in the nature of a definite line drawing with even partial dimensions might:

(a) Be subject to mis-interpretation by those not used to reading dimensioned drawings.

(b) Convey the impression that the designs were to be drawn more or less in imitation of the blueprints

(c) Tend to act as a restriction on the free play of the imagination as to proportion, etc.

With all these points in mind we naturally turned to our cheapest and quickest method of copying—the mimeograph. A few experiments soon showed that we could, by using extreme care, make rough sketches on the typewriter stencil sheet, using the typewriter to print in the titles and notations for each as we went along. Our sketches, as explained above, were purposely not to scale and somewhat out of proportion; being planned to convey the barest outlines of an idea rather than a definitely shaped object. However, we tried to be extremely careful to make the foot notes entirely clear and the results desired definite in scope.

The plan as a whole worked out to our entire satisfaction. By giving the date when the design for each object would probably be needed, the drawing supervisor was enabled to work the outline in with her own, previous to the opening of the school year. We invariably found that the boys had their designs ready at the time designated. Of course they were a vast improvement on those the shop teachers had secured in other years. In some cases they were a little too elaborate or involved, but the essentials were there and it was easy to omit sufficient detail to bring the accomplishment within the ability of the child. We found that many boys would submit their sketches to the shop teacher after school, or at other opportune times, in order that they might be able to take intelligent structural criticisms back to drawing class with them the next day.

Designs were transferred to the wood by tracing over soft pencil carbon paper.

An exact, detailed reproduction of the outline is given below.

CO-OPERATIVE OUTLINE, MANUAL TRAINING AND ART DEPARTMENTS.

GRADE SEVEN B.

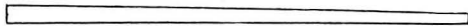
Ex. 2.

Cane.

Note—Cane will be made from red gum wood 1 3-16" thick.

Boy should decide on:

- Length of cane—about waist high.
- Thickness at each end both ways, determining taper.

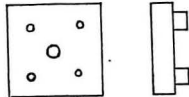


- Cross-sectional shape of cane, i. e., whether square, round, octagonal, etc.
- Whether handle is to be different from body of cane and if so design for same.
- Some simple decorative design to be carved upon the cane.

Ex. 4.

Table Mat, or Flower Pot Stand.

Note—This article is designed to keep hot coffee pots, dishes, etc., away from finished table tops. The holes allow for contraction and



expansion of the wood without warpage. Their arrangement offers an excellent opportunity for design. This article may also be used as a stand on which to place flower pots.

Boy should decide on:

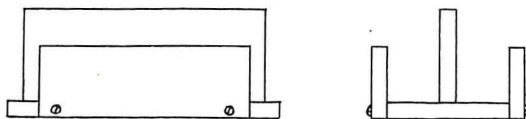
- Size over all.
- Outline shape, with dimensions.
- Size, number and arrangement of holes.

GRADE SEVEN A.

Ex. 3.

Letter Holder.

Note—This letter holder should be designed to hold letters when they are enclosed in their envelopes; nothing larger. It is to consist of three upright



pieces and a bottom piece, fastened together with screws as shown.

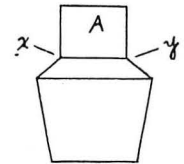
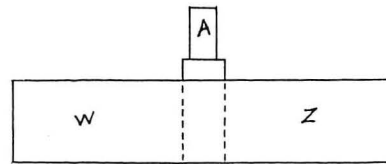
Boy should decide on:

- All dimensions, proportions included.
- All outlines.
- Surface decoration. (Decoration on this piece is not advised save for the fastest workers.)

Ex. 4.

Match Box.

Note—This article is to be made from thin wood and is designed to have a small box of safety matches slipped over the wooden tongue "A"



so that when the outer cover of the box rests on the shoulder at "XY" the inner part of the box will be forced up by tongue "A" far enough to expose the matches for easy access. This should be kept in mind in determining the size of "A." The two chambers, "W" and "Z," are for burnt matches.

GRADE EIGHT B.

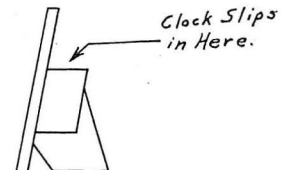
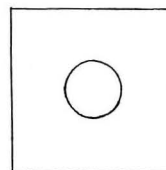
Ex. 2.

Bird House.

Note—This is to be any kind of a bird house the boy may wish to design, with reasonable restrictions as to size. It should be small enough so that he may easily work on it on top of his manual training bench. Boys will be expected to pay for any unusual amount of lumber. The house must be entirely original thruout—no two alike. The use of round sticks, bark, etc., is suggested.

Boy should decide on:

- Kind of material to be used.
- Size, shape and dimensions.
- Exterior finish.
- Number, size and kind of openings.



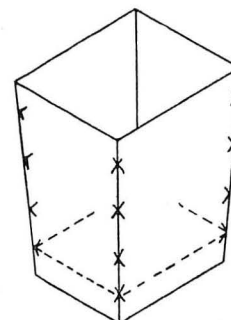
Ex. 3.

Clock Case.

Note—A thin wood model for a small clock.

Boy should decide on:

- Size of clock to be used.
- Shape and size of front panel and of the opening.
- Decorative design for the front panel, if desired.



GRADE EIGHT A.

Ex. 2. A Small Waste Basket.

Note—Corners laced with strips of raw hide. Panels made from wood $\frac{1}{4}$ " thick, not over $11\frac{3}{4}$ " wide.

Boy should decide on:

- (a) Proportions and dimensions, using tapered sides.
- (b) Outlines.
- (c) Finish.

Ex. 3.

An Optional.

Note—Objects selected must be small furniture types within the range of the boy's capabilities in the shop and the limited time at his disposal.

Boy should decide on:

- (a) Two or more projects and submit to the shop teacher for approval of one.
- (b) Design and dimension completely.



Illustration C. Work of the Author's Students in the Belvidere High School.

Open House Day in an Illinois High School

Lila I. Lewis, Belvidere, Ill.



LAST year we held an "Open House Day" in our high school, exhibiting work in all the departments. The accompanying photographs are some of the groups in the art department that warranted and earned considerable interest among the patrons of the school.

Illustration "A," a reed tray and a group of pottery consisting of a teapot, vase, spill and statuette, is all the work of one high school boy. The group consisting of a teapot, creamer and sugar bowl, fudge-plate, spill and tray is the work of a high school girl. ("B".) Illustration "C" is by the various pupils of the class.

The reed trays in the accompanying pictures were woven on chestnut frames, stained and framed in the classroom. The tray bases were pencil sketches made from nature and water colored. In several instances, as in "A," bolting cloth was placed over the painting which softened the colors, blending them into a charming piece of work.

The tea tiles shown in illustration "C" were very attractive. This is the first problem in our pottery classes—the designing of a tea tile within a six-inch square. Following is the method we pursue:

1. Taking into consideration whether our finished tile is to be in relief or inlay work—we make our design accordingly. When a good design is obtained it is traced with pencil to rice paper.

2. A six-inch square is drawn on manila paper, a well-rounded ball of moist clay is placed in the center of the square and then pushed and spread to fill the space. If more clay is needed to make the required thickness (one-half inch) it is added to the top rather than filling out at the sides.

3. When the top is properly smoothed (with fingers and steel tool), all edges vertical and corners square, the tile is turned to see that the underside is free from defects, and in turn properly smoothed.

4. A margin of one-half inch is then drawn around on the top of the tile. Measuring two inches from each corner, lines are drawn to form four squares

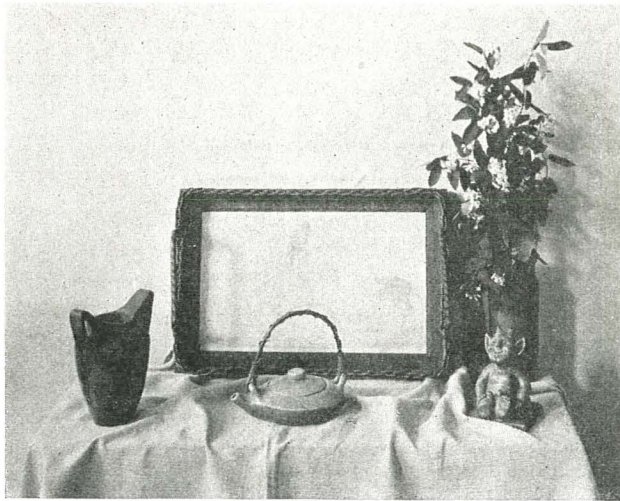


Illustration A. Reed Tray and Pattern.

as shown in illustration "D." These squares are scooped out one-eighth of an inch in depth, to insure against warping. This is the back of the tile.

5. The tile is reversed to the smooth side, the rice paper design fitted over it and held in place by slightly moistening the surface of the tile with water. The design is then traced to the clay with a sharp-pointed tool. After tracing the paper is removed and our tile is ready to prepare for inlay or relief work.

6. If *inlay*, we follow the outline of the design with a sharp wedge-shaped basswood tool, cutting down about one-eighth of an inch. These strokes, which form the outline of the design, must be clear-cut and vertical. The edges of our design thus pre-

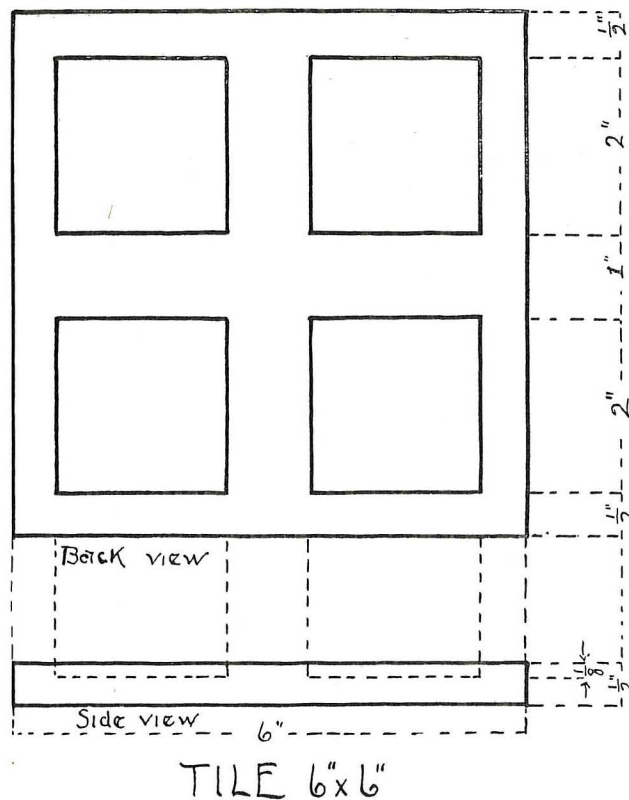


Illustration D.

pared—the space for color (inlay) is then carefully scooped out.

7. We next decide on the color or colors for the *underglaze*, estimate on the quantity required for the design and place that amount in a mortar. This underglaze is ground thoroly until free from lumps. An equal amount of dry clay is likewise prepared.

8. The powdered underglaze is placed on plate glass, forming a little mound. A hole is made in the center of the pile. This holds the water that is gradually mixed with the powder. The powdered clay is then added with sufficient water to make the substance the consistency of modeling clay.

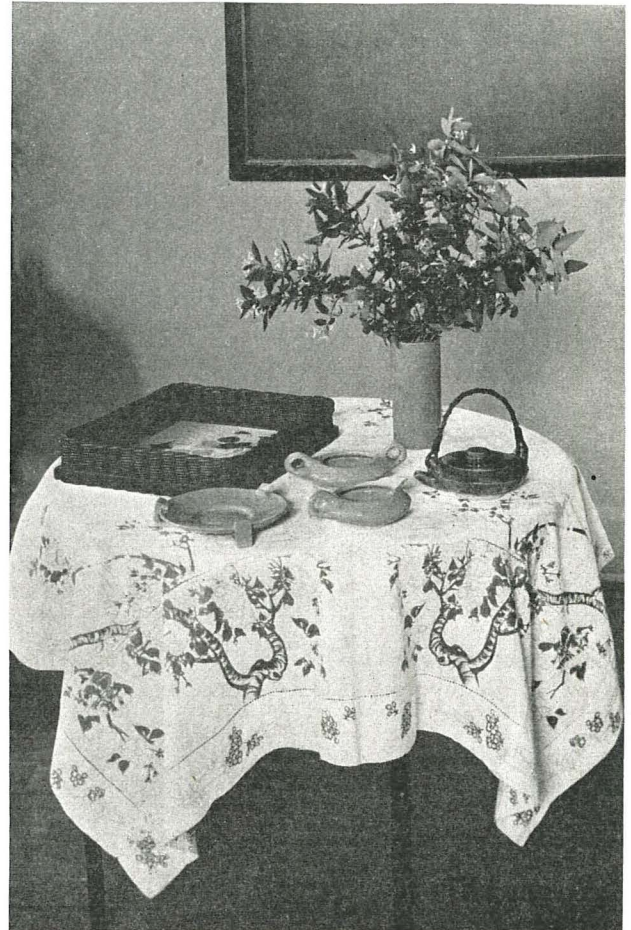


Illustration B. Work of One Girl in the Author's Class.

9. With the aid of a basswood modeling tool, the design space of the tile is moistened along the sides and on the bottom, and filled with coils of prepared underglaze. These coils are pressed firmly into the space and extend *up* and *over* the design space.

10. When leather-hard the surplus underglaze is scraped away and, in fact, the top of the tile is scraped smooth a little below the original surface. This leaves the design clear-cut. After drying, the tile is ready for firing.

It is understood, of course, that between lessons our problems are kept at the proper moisture by being wrapped in damp cloths and placed in a damp closet.

Following the tile problem is the modeling of a spill, the base a circle three inches in diameter. The sides are built up with coils by hand. (We do not possess a potter's wheel.) The succeeding problems depend upon the pupil. Sometimes it is a vase, sometimes a bowl—the latter carrying with it the applying of handles. The wall-pocket is an interesting problem requiring good design and its application. (See Illustration "C.")

In every case the object is designed and properly drawn on paper before it finds its way to clay.

You may have wondered a bit at the seemingly incongruous statuette in illustration "A." "This," explains the lad who made it, "represents the *spirit of pottery*. It presents the two extremes, the angelical (wings on back of figure) and the demoniacal (note horns). So it is with my pottery! It is either good or bad, but still trying I will *smile—always smile!*" An idea not to be scoffed at! This lad is only one of many with like experiences, but he *expressed* himself.

Pottery teaches us all something invaluable besides appreciation!

Commercial Standards for Woodwork in the Schools

Geo. Henry Jensen, Director of Department of Mechanic Arts and Prevocational School, Stockton, Cal.



BUILDING equipment and doing general repair work about the school buildings, should be the easiest possible kind of Mechanic Arts. However, I believe those who have tried this experiment will agree with me that, practically, it proves to be quite difficult.

The first difficulty that we encounter is the fact that boys are desirous of making projects which will be available for them to take home and use. There are, however, serious objections to this idea. In the first place, this fosters a selfish spirit on the part of the individual. Since there is no other department in the schools where this is done, why should the Department of Mechanic Arts provide the exception? Secondly, when individuals are following this plan, it is not possible, as a rule, to make large projects so as to give them the variety of experience which is possible when a piece is undertaken which requires the combined efforts of three or four members of the class in order to complete it during the semester. Another element to be considered is that we must overcome the idea which still prevails, unfortunately, in many places, that Mechanic Arts is not a study but rather a form of recreation. When it is pointed out to the prospective student that he has something definite to gain when equipment is built for the school, and repair work is done without going to the extent of monotonous repetition, he is able to see the advantage of this over making individual pieces to be taken home.

Comparison of the Two Methods.

By way of comparison, look at the boy who has built an ornate library table as compared with the boys who are building work benches for use in the shop. The boy who learns how to build the work bench is able to apply this practically to other problems, while many have had the experience of the "library table" boy who is not able to repair even a broken locker door in the gymnasium.

There comes to my mind the experience of a boy who had very lavish tastes concerning inlaid furniture.

He spent the entire year, devoting many extra periods, making a very elaborate game table with inlaid top, legs, etc., and polished and finished it up in a most efficient workmanlike manner. The following year it happened that some business took me to the home of this same boy, and the father, a rather blunt man, called attention to the inefficiency of our department inasmuch as this "A" student attempted to adjust a door that was dragging, and made such a failure of it that he had been obliged to call in a carpenter to complete the work. This was because the boy had not learned to set hinges, the fault, naturally, of the department where he had received his instruction; but a most common and prevailing one in spite of sincere efforts to cover the whole field of necessary tool processes in this work. If he had been working on a course such as is the case where equipment and repair work is done, there would not have been the temptation to devote hours of successive periods to processes of repetition at the expense of processes of variations.

When work of the nature for which a plea is here being made is given, it at once vocationalizes and industrializes the work. The Department of Manual Training and of Mechanic Arts must be made very vital, both vocationally and industrially, if this plan of wider and better practical application is to be adhered to.

Another strong argument in favor of this method of procedure is that a layman can appreciate the value of this kind of training. When boys are really making things that not only have a commercial value but also a direct trade application, he can appreciate it where he failed to appreciate the "head, heart, and hand" theory.

Appeals to the Board of Education.

The Board of Education, when being solicited for additional shop buildings and equipment, is more inclined to give a ready ear when the shops already in existence show a saving of from 25 to 50 per cent in equipment that has been built by the classes, not at a sacrifice of instruction and technic, but rather



Figure 1. Completed Drafting Table.

at a decided gain to the student. This, of course, is a departure from the traditional form of Manual Training, or rather it is a departure from the statement in defense of the department as given in connection with the traditional work. However, we are still doing all that the traditional work did for the student, in the way of both motor and mental activity to say nothing of the great benefit derived by the student in addition to what he was getting under the old scheme.

Policy of the Stockton Schools.

Since the organization of the Department of Industrial Arts in the Stockton schools, the theory here set forth has been the working basis in the entire department. The work in the Prevocational School, organized one year after the department in the high school, is making very definite showings along this line. All of the school printing is done in the Print Shop. The repair work in the Woodturning, Mill Room, Carpentry Shop, etc., which requires the services of a machinist, is done by the boys in the Prevocational Machineshop course.

The boys in Carpentry do the woodwork for the Prevocational School and some of the other schools, the same as is being done by the boys in Woodworking in the high school. The method of handling this woodwork is the real subject of this article. Due to the recent organization of the Vocational School, as already referred to, it has been necessary for the Drafting Department in the high school to make the pattern drawings for a Power Hack Saw, the class in Patternmaking at the high school to make the patterns, and then after these have been cast at a local foundry, the boys at the Prevocational School machine and assemble them. (The "Prevo" boys are already working on the first parts of the hack saw.)

Preliminary Steps in the Building of Drafting Tables.

The equipment for the drafting room was made a vital issue in both the drawing and shop courses. The drafting table, a photograph of which is shown in Fig. 1 and working drawing with details in Figs. 2 and 3, was first designed by the writer. Most of the members of the classes were beginners so that it was not possible for them at the outset to make the first working drawing from a rough sketch. Furthermore, to make these drawings in the beginning would have required a week or two of idle time on the part of those who were waiting for the preliminary steps in the manufacture of the drafting room equipment. About half of these boys had worked ninety minutes weekly in the Seventh Grade and one hundred and eighty minutes weekly in the Eighth Grade.

After they came to the high school, a rod of the table was laid out by the shop instructor, using the design just mentioned. The cabinetmaking boys were given instruction on rod-making at the same time and were obliged to make careful notes. This lecture, as well as other lectures from time to time during the processes of construction, was not only made the basis for notebook work, but for written examinations as well.

The joinery boys, and all others connected with the manufacture of these tables, were taught the use of the rod and how to read it. The stock was gotten out according to factory methods. In fact, procedure from time to time, from the very beginning until the tables were finished and in place, was carried on according to up-to-date and modern practices.

Appoint Foremen.

The boys were formed into groups, with a foreman in each group, for cutting and modeling different materials. The general scheme of routing for the different groups of stock for these 24 tables was as follows: (1) The rough kiln-dried lumber was first cut to length at the swing cut-off saw. (2) From there it was taken to the jointer for a face and jointed edge. (3) It was then moved by truck to the saw table and ripped to width. (4) After ripping to width, it was planed to thickness on the power planer; after this, in the preparing of wide pieces, it was again jointed preparatory to making the glue joints. (5) Those pieces requiring modeling were then modeled according to the detail drawings used in connection with the rod. This included grooving, dadoing, mortising and tenoning, and rabbeting.

Assembling.

After the stock had been properly milled and modeled, the assembling was carried on by groups with a foreman in charge of each group. As seen by the photograph in Fig. 4 a large part of the assembling consisted in making the boxlike structures for each end. This gave material for valuable and instructive lectures that brought out the proper size,

proportion and relation of the rails, stiles, muntins and panels.

The practical experience derived from clamping up eight dozen such frames is quite different from that ordinarily derived when not more than one-half dozen of these are clamped up in a class during the entire year.

The manufacture of glue, its ingredients, the proper methods of using and testing it, were studied in this connection. After assembling these boxlike ends, the front and back rails were attached so as to join them. The tops, already glued up separately, were then nailed in place. After nailing the tops, the ends were smoothed up. The hanging of twelve dozen doors afforded opportunity for the entire class to acquire considerable skill in the proper setting of hinges. If the photograph and detail drawings are carefully noticed, it will be seen that the lip on the back edge of the doors necessitated that these be hung absolutely accurately. The assembling of two dozen drawers made it possible for all to learn how to construct properly the necessary jigs for purposes of duplication.

After assembling, all of these tables were finished up by hand. The tops were nailed in place, sawed to the proper length and then sandpapered. After the other parts of the tables were thoroly sandpapered, one coat of orange shellac was applied. The nail holes were then puttied (the putty was colored to match the orange shellac). When dry, it was sandpapered smooth with No. 0 sandpaper, then a second coat of orange shellac was applied. This finishing process was used as the basis for lectures on sandpaper, shellac, denatured and wood alcohol, and the manufacture, use and preparation of same.

Installation.

The tables completed and ready for installation in the drawing room, were first put in without nailing, according to the layout which had been worked out by the boys in the Drafting Room. After it had been determined that the layout was as it should be, quarter-round was nailed on around them to hold them in place.

Mechanical Drawing Made Practical.

It is not to be supposed that the boys in the Drafting Room did nothing except to plan the spotting of the tables after they were completed. They worked from the design, planned by the writer as previously referred to, which had been made for the layout of the rod. Using the rod for all of their vital measurements, they made complete assembled and detailed drawings (Figs. 2 and 3).

The detailed drawings made by the boys in the Drafting Room were used in the construction of the drawers, doors, paneling, modeling, etc. Even tho the design had practically been decided upon before the stock was roughed out, the boys in the Drafting Room made a comparative study of different drawing tables. Some minor changes were made in the original design after the stock had been roughed out.

Every boy who took part in this work is now able to give first-hand information concerning the drafting tables and is able to argue logically concerning the relative merits of the types studied.

Drawing Boards.

In addition to the tables, the drawing boards (Fig. 5) were worked out in the same way. Attention is called to the spline which was made from 3-ply veneer paneling so as to make the joints stronger than is usually the case where soft wood is used for the end strip and merely tongued. Again referring

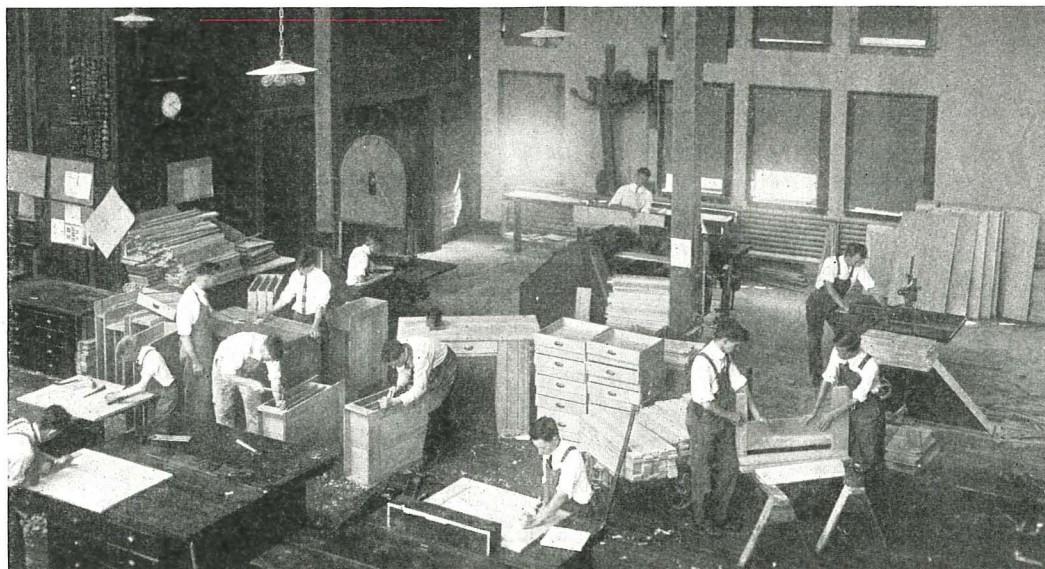


Figure 4. Boys at Work on Drafting Tables.

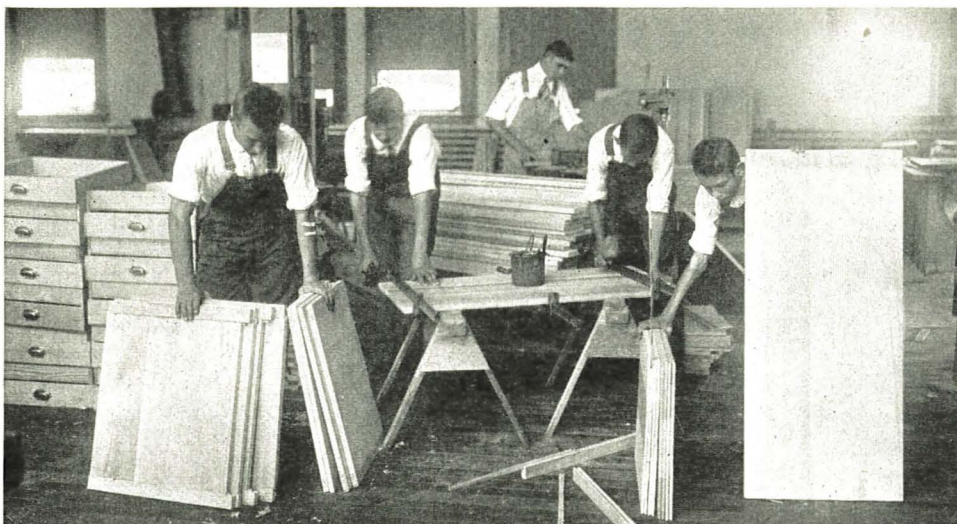


Fig. 5. Boys Making Drawing Boards.

to the figure, the two boys in the center are shown clamping stock for two boards. A truck-load of stock prepared for gluing is standing immediately behind them. The boy on the right hand end of the figure is holding one of these pieces which has been glued and surfaced, in his left hand, while in the right hand he is holding four boards with the grooves already cut and a spline in one of them.

On the floor, near these four boards, are the two end pieces with two more splines. The boy at the left of the figure is shown holding four completed drawing boards in his left hand and four that are

ready for the final modeling, after the ends and splines have been glued in place, in the other.

Filing Cabinet.

The filing cabinet (Fig. 6) was designed in its entirety by the Drafting Room boys. They were told the approximate capacity desired and the maximum size of the drawings to be filed. The triangular openings between the top of the sections and the stairway will be utilized later. A cabinet of similar construction was used for class demonstration. The shop part of this was carried on in the same manner as the manufacture of the drawing tables and boards.

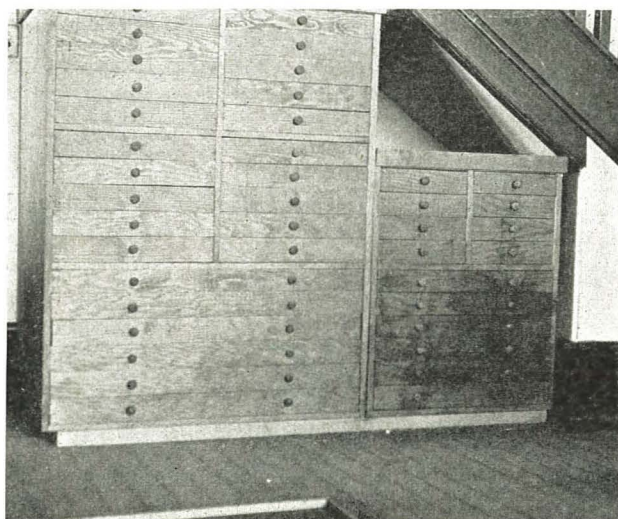


Fig. 6. Filing Cabinet.

WOOD FINISHING

State Supervisor of Manual Training and Assistant for Industrial Education, Madison, Wis.



THE scarcity of aniline dyes, due to the present war in Europe, is responsible for a good deal of worry to the wood finisher. This condition has been partly responsible for the return to popularity of walnut and of other woods that are finished in the natural, and of white and ivory enamel work. In some cases the wood finisher has to go back to pigment and vegetable stains, and to acids to meet his requirements.

At the present time some aniline dyes are being manufactured in the United States. The plants for manufacturing the dyes are, however, small, and the output is limited in quantity and to a few colors. Capitalists are wary about investing the millions of dollars that would be necessary for experimenting and developing the aniline dye industry in this country, without some assurance that there would be a permanent future guaranteed by the government.

But why, one might ask with reason, with such conditions prevailing, do we not use vegetable colors or dyes? Well, we are trying to do so now. The Forest Products Laboratory at Madison, Wis., has been experimenting in this field and has been successful in producing a yellow dye from the wood of the osage orange, that is being used in the leather, cotton, and paper industries. This, however, is practically the only new vegetable dye that is being manufactured. An attempt was made to obtain a red, the color most desired, by extracting that color from the gum which holds the seeds to the cone of the California redwood. The results, however, have not been entirely satisfactory from the commercial standpoint.

The vegetable colors or dyes are usually the extract from various dyewoods that come from Central and South America. This coloring matter requires development with some metallic salts such as bichromate of potassium, or copper sulphate. The more common colors or extracts are extract of logwood, hematine paste, faustic extract, extra faustic extract, hypernic extract, and osage orange extract. Logwood and hematine produce grey to black shades. Faustic and osage orange give yellow; hypernic gives dark red shades. The intermediate colors may be produced by varying the proportion of colors. The method of treatment is to stain the wood with a solution of the extract or color and then to treat it with a weak solution of the metallic salts. The purpose of the salts is to act as a mordant.

Aniline dyes may be obtained (in one pound tins) from various firms or agents thruout the country. The following dyes will be found suitable for most of the work in wood finishing. The spirit stains may

well be eliminated, as the water and oil stains will meet most requirements.

Water soluble—

Acid Green
Metanil Yellow
Crocein Orange
Nigrosine, Powdered
Wool Red
Walnut Crystals
Brilliant Scarlet
Bismark Brown (also in spirit)

Oil soluble—

Oil Black
Oil Yellow (also in spirit)
Oil Scarlet
Oil Red
Gilonite

Formulas for water stains:

Forrest Green—

85 parts Acid Green
15 " Metanil Yellow

Dark Green—

58 parts Acid Green
30 " Metanil Yellow
12 " Nigrosine

Mahogany Brown—

65 parts Crocein Orange
8 " Wool Red
22 " Nigrosine
5 " Carbonate of Soda

Mahogany Red—

38 parts Brilliant Scarlet
30 " Wool Red
24 " Crocein Orange
5 " Carbonate of Soda
3 " Nigrosine

Mahogany Dark—

43 parts Crocein Orange
19 " Brilliant Scarlet
17 " Wool Red
15 " Nigrosine
5 " Carbonate of Soda

Fumed Oak—

17 parts Chromic Acid (solution, $\frac{1}{2}$ oz. to 1 pt. water)
30 " Water
53 " Ammonia

Grey Oak—

80 parts Nigrosine
10 " Metanil Yellow
5 " Crocein Orange
5 " Carbonate of Soda

Grey for Oak, Birch, Maple—

1 part Solution of Nigrosine reduced in strength to shade desired.
1 teaspoonful Acetic Acid to 1 qt. solution.

Walnut—

1 part Walnut Crystals—Water solution to desired strength
 $\frac{1}{2}$ teaspoonful Bichromate of Potassium to 1 qt. stain

Brown—

1 part Bichromate of Potassium in water solutions of various strength will give various shades of brown on oak and chestnut

Bismark Brown in solution with a little nigrosine or walnut crystals will give various shades of mahogany. May also be used for coloring shellac.

Formulas for oil stains:

Fumed Oak—

59 parts Crude carbolic acid

25 parts Gilsonite (solution)
 6 " Black (solution)

Mahogany (brown)—
 6 oz. Gilsonite
 5 oz. Oil yellow
 4½ oz. Oil scarlet
 2½ oz. Oil black
 8 oz. Boiled linseed oil
 13 oz. Crude carbolic acid
 Add naphtha or benzine to make one gallon of stain.

Mahogany (red)—
 4½ oz. Oil scarlet
 2 oz. Oil red
 1 oz. Oil black
 8 oz. Boiled linseed oil
 14 oz. Crude carbolic acid
 Add naphtha or benzine to make one gallon of stain.

Mahogany (dark)—
 3½ oz. Gilsonite
 2 oz. Oil black
 4 oz. Oil scarlet
 ¾ oz. Oil red
 2½ oz. Oil yellow
 8 oz. Boiled linseed oil
 14 oz. Crude carbolic acid
 Add naphtha or benzine to make one gallon of stain.

Flemish Oak—
 3 oz. Gilsonite
 2 oz. Oil black
 2 oz. Oil yellow
 1½ oz. Oil scarlet
 8 oz. Boiled linseed oil
 14 oz. Crude carbolic acid
 Add naphtha or benzine to make one gallon of stain.

Golden Oak—
 6 oz. Gilsonite
 ½ oz. Oil yellow
 ¼ oz. Oil black
 ⅛ oz. Oil scarlet
 4 oz. Crude carbolic acid
 8 oz. Boiled linseed oil
 Add naphtha or benzine to make one gallon of stain.

Weathered Oak—
 3½ oz. Gilsonite
 2½ oz. Oil black
 ¾ oz. Oil yellow
 ¼ oz. Oil scarlet
 8 oz. Boiled linseed oil
 4 oz. Crude carbolic acid
 Add naphtha or benzine to make one gallon of stain.

Mission Oak—
 7 oz. Gilsonite
 ½ oz. Oil black
 ¼ oz. Oil yellow
 ¼ oz. Oil scarlet
 4 oz. Crude carbolic acid
 8 oz. Boiled linseed oil
 Add naphtha or benzine to make one gallon of stain.

Ebony—
 3½ oz. Oil black
 1 gal. naphtha or benzine
 For ebony shellac should be colored with spirit black or lamp black.

Fumed Oak—
 5 oz. Gilsonite
 1 oz. Oil yellow
 ¾ oz. Oil black
 ¼ oz. Oil scarlet

4 oz. Crude carbolic acid
 8 oz. Boiled linseed oil
 Add naphtha or benzine to make one gallon of stain.

By increasing or decreasing any of the colors, various shades may be obtained. Standard solutions may be made.

A good method of making and matching stains is to prepare standard solutions of each stain. This is done by taking a quantity of the stain, placing it in a clear bottle and making a solution. Always label the bottle with name and quantity of the stain. By means of a long measuring glass find the proper proportions of the solutions that make the stain. By increasing or decreasing a particular color, a different shade may be obtained. The formulas for the stain in powder form may be worked out from the solutions. If, for instance, yellow requires twice the quantity of red to make a particular stain in solution, it will require the same quantity in powder form.

Pigment oil stains:

Golden Oak (medium)
 Asphaltum (extra golden) thinned down with turpentine or benzine to shade and consistency. Add ½ pt. raw linseed oil to 1 gal. stain to assist working qualities.

Golden Oak (dark)—
 Burnt Turkish umber
 2 parts Boiled linseed oil
 1 part Turpentine
 For lighter shades add raw umber or ocher; for reddish shades add burnt sienna.

Mahogany (light)—
 3½ oz. Chrome yellow
 ½ lb. VanDyke brown
 1½ lb. Burnt Italian sienna
 6 pts. Benzine
 1 pt. Boiled linseed oil
 ½ pt. Japan drier

Mahogany (medium)—
 ½ lb. Chrome yellow
 1¼ lb. Burnt Italian sienna
 1 gal. Turpentine
 ½ pt. Boiled linseed oil
 ½ pt. Japan drier

Mahogany (dark)
 1¼ lbs. Burnt Italian sienna
 ¼ lb. Rose pink
 ⅛ oz. Black
 1 pt. Boiled linseed oil
 ½ pt. Japan drier
 1 gal. Turpentine

Mahogany (dark)—
 1½ lbs. Burnt Italian sienna
 ¼ oz. Drop black
 5 pts. Boiled linseed oil
 2½ pts. Turpentine

Weathered Oak, Early English—
 VanDyke brown with a little black added, will give various shades of weathered and early English.

The foregoing formulas will suggest the method of working out various other wood stains.

There is no greater blessing in this world than a steady job, with increasing efficiency and hence increasing wages as time goes on; and the only way to insure that happy state of each individual is to give him the training for some skilled vocation in life, whether it be in business, in a profession, or in a trade.—*Paul H. Hanus.*

INDUSTRIAL-ARTS MAGAZINE

Board of Editors

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EDITORIAL

WORK AND EDUCATION.

THERE is a wholesome, old-fashioned notion that is gradually regaining its place in educational thought. That is the notion that every person is entitled to a generous share of good, hard work intelligently planned and persistently followed.

We have gone thru an extended period in which the value of vigorous and sustained effort has been minimized if not practically ignored. This has been largely due, we think, to a misconception of interest. Over-zealous persons have conceived interest as whim, and the pursuit of interesting ends as frolic. Such a conception sets up effort as opposed to interest. Hence, there has been a tendency to eliminate everything that cannot be given in the form of play or entertainment.

Pupils have been led to think that there are no serious tasks to do. They fail to understand that with multitudes of people, if not with most people, life is an interminable struggle with obstacles. They fail to appreciate the truth that much of the *interest* in life and the joy of living is derived from the intense struggle with difficulties and the consciousness of conquering them.

The enthusiasm that led to the discovery of the North and South Poles was no less because it met great difficulties and cost lives and suffering. The exploration of the African jungles was no less *interesting* because it encountered the terrors of pestilence and death. The eradication of Yellow Fever was no less interesting because it meant the reverse of fun and entertainment as well as the sacrifice of heroic lives. The building of the Panama Canal was no less interesting because it faced conditions and problems which had been pronounced superhuman.

A new note is being sounded. Rather an old note is being revived and its volume should be augmented. That is that genuine interest arises out of tasks that are needful and worthy of performance, and that genuine satisfaction comes of tasks well done or efforts valiantly made. Young America should know that there are necessarily times in life for uncomplaining drudgery and obedience; that self-forgetfulness is a virtue; that one may not frolic thru the tasks of life and expect to be accounted among those who have served their fellows; that one

needs enthusiasm for mastering obstacles, rather than facility in escaping them.

We have never championed the cause of rigidity and routine, rather we have been their enemy. But we do stand for more persistent, strenuous work without the bewildering haze of make-believe and folderol. We covet for the boys and girls more of the spirit of the pioneer in the daily problems and duties of school life.

When the school is vitalized by the compelling interest of significant work and buttressed by the determined effort to achieve in spite of difficulties, then we may expect boys and girls to be much more fully prepared for life outside the school.

LOST MATERIAL.

ONE of the most prolific sources of annoyance and trouble in the manual training shop is the loss of pupils' work. A boy begins the construction of a piece of work. At the close of the recitation he puts it away. The next time he comes to the shop, his piece of work has disappeared. After diligent search and loss of time, he fails to find any trace of the lost material and starts anew with diminished enthusiasm. Many instances have come to notice where such disappearances have occurred so often that boys became discouraged and dropped the work or continued in a half-hearted way.

This is a difficult matter to handle, especially if there are no facilities provided to take care of unfinished work. No teacher should rest content, until some means has been provided for caring for pupils' work and some system worked out by which every single piece of material left in the shop by a pupil may be immediately, and with certainty, delivered to him when he has need of it.

AFRAID OF ART.

THE final statement of David Snedden as quoted in the *September Industrial-Arts Magazine*, from his address on "Art Education and Industrial Results" arouses our curiosity. Dr. Snedden says "We are afraid to get down to brass tacks in art education" but he does not tell us of what we are afraid. An American resents being called afraid, above all things.

There is coming slowly to the American mind, the realization that we may not acquire art as we have acquired other things, by purchase or imitation. Art education for industrial results involves the development of public taste for consumption, as well as the training of designers for production. This development can be carried on most effectively thru school instruction.

At the Third International Art Congress for the development of drawing and art teaching and their application to industry held in London, in 1908, the American schools were represented by exhibits of

work which compared favorably with those of other countries. At the fourth meeting, in Dresden, we were not behind other countries in presenting our methods of art instruction and results in the form of exhibits. Our great expositions at Chicago, St. Louis, Buffalo and San Francisco have been international shows of international arts and industries, at which we have never appeared at a disadvantage in art or industry.

Why then are we "afraid to get down to brass tacks in art education" and of what are we afraid?

We may take the honors noted above with modesty for we know they represent the highly selected products of American art and industry, rather than standards of general accomplishment.

We may realize that art is established in the mind of the American as the accomplishment of a select few, who have inborn talent to which the average individual may not aspire.

This conviction and its results are evident in the grade schools where mere children decide that they have, or have not, the "talent" which will allow them to perform school exercises in music, drawing and design.

We may never get down to "brass tacks" in art instruction until children are trained in school to realize and to apply to the purpose, the elements of form and color. Does our fear lie in this conception that art is a creative accomplishment which very few may acquire? If so, we may well begin humbly to train ourselves to study simple, effective design for a definite, tangible purpose. Busy with this evident need, we may find that the bogey "art" has become an ideal which may inspire us to more than commonplace effort.

WORK PERMITS.

IT is well nigh impossible to successfully cope with the problem of child employment under a system of permits in which the permit is issued *to the child*. Papers permitting the employment of boys and girls under 16 years, should be issued (if at all) to employers and *not to the children*. It should be understood that the permit is not the property of the minor and should never fall into his hands. The permit should not be a blanket permit issued "to whom it may concern" but should be a permit to work in a certain establishment at specified employment. When the child leaves that establishment, the permit should be returned to the school authorities.

The adoption of such a plan for the issuance of employment permits will greatly improve the regularity of employment among "permit" boys and girls, and will afford school authorities added opportunities for vocational guidance.

ALLOWANCE OF TIME.

We are in hearty accord with the report of the Committee on Time Allowance for the Manual Arts of the Eastern Arts Association which was published in our last issue. It is extremely gratifying to hear teachers of industrial arts speak out emphatically in reply to criticisms. For the past four or five years, speakers and writers on educational topics have been quite ready with severe criticisms on manual arts work. This has been largely due to the absence of any vigorous defects on the part of teachers in this work. No doubt, the absence of any replies to the criticisms has encouraged these speakers to become more sweeping and spectacular in their denunciations.

Partly because of the glaring ignorance of some of the speakers and committees that made the adverse criticisms, manual arts teachers have proceeded with their work of maintaining an indifferent attitude on the subject. Lately, however, the effects of this indiscriminate fault finding have begun to be felt in the school work, and associations of teachers are finding it necessary to show the *real* causes of the shortcomings of manual training work. This report points out one of the chief reasons why the work has not been more effective. It is to be hoped that manual arts teachers will continue to point out the conditions in school administration which hamper their work, and in doing so will locate the responsibility for these conditions.

The report is a valuable one in many respects. Associations of manual arts teachers have continuously refused to go on record in regard to the real purposes of their work. In this respect, the report is unique. In one instance, however, the committee resorted to a pedagogical evasion of a real issue when it stated the specific purposes of manual arts in the sixth, seventh, and eighth grades. Almost any interpretation can be given to the expression, "Lay a broad foundation of experience and information that will assist each pupil to interpret the social forces at work in the environment."

If manual arts associations will continue to point out that many, if not quite all, of the shortcomings of industrial work in the schools are due to conditions in the administration of the schools, these conditions will be improved and the criticisms will soon cease.

The greatest task before commerce, tho we keep entirely on an economic basis, is to increase the efficiency of the human material employed in all the branches of its daily activities. To do that most effectively we must largely reverse the old order. The time will come when there will be no unskilled labor, when the machine will do everything that demands only routine operations, and when every man who works will work with his brains more than with his hands.—*Thomas A. Edison.*

BRIEF ITEMS OF INTEREST

EXTENSION WORK DONE IN THE MISSISSIPPI AGRICULTURAL HIGH SCHOOLS.

Sam E. Woods, Vice-President of Mississippi Manual Arts Association.
Director of Manual Arts Dept., Pearl River County
Agricultural High School.

THE first Agricultural High School in Mississippi was established in 1908. These schools are supported by a special tax on the property of the county as well as from one thousand to four thousand dollars per year from the state, depending upon the number of boarding students enrolled.

Agriculture was required and taught from the beginning. Some of the schools began with agricultural and literary departments. From the beginning others had Domestic Art Departments. Now home economics, as well as agriculture, is required in all of the schools receiving the state aid.

The first Manual Training Department was established in the Lamar County Agricultural High School in 1910. Since then 21 of the 43 schools have begun some kind of manual arts work, and it will be but a year or so until the state will require it the same as other industrial work.

So far we have no regular course adopted by the state, but each school gives what its pupils need most. Woodwork, including bench, joinery and cabinetmaking, as well as mechanical drawing are taught in practically all the schools which give this work. Blacksmithing, forging, concrete work, carpentry, farm mechanics, painting wall papering and home decoration are taught in others.

Any citizen in the county can call on his school for aid and always get it, if it can be given. The Agricultural Departments being the oldest are doing the most in this extension work. The farmers learn to look to the Agricultural High School for help. The school sends out the instructor, or some boy, who is capable of doing the work of terracing land, inoculating hogs, etc.

It has only been a short while since the Manual Training Departments of these schools have made any systematic effort to help the citizens of their counties, and not all of them are doing this work yet.

I wrote for a report from every school that has a Manual Training Department. The extension work is being done in eleven schools. Six schools reported that they were not doing anything, as one man was teaching agriculture and manual training, and did not have the time to give to this work. Four reported that they had not done anything this year, but would begin the work next year. The reports were varied, three schools reported having carried on campaigns for better homes, poultry houses, hog houses and that they sent blueprints out to farmers who asked for them, and then sent their manual arts instructor and several of their senior boys to direct the work and help in the construction.

The schools have built sweet potato houses and kilns for drying potatoes over the county, thus saving the farmers several thousand dollars. Seven schools report demonstrating the use of home made farm implements, fly traps, wheel trays, iceless refrigerators, fireless cookers, portable hog fences, terracing implements, clover seed cleaners, harrows, etc., and introducing them to the people thru the County

Farm Demonstrating Agent, and Home Demonstration Agent. Most of the counties that have Agricultural High Schools have these agents.

One school furnished blueprints, estimate of cost, etc., for building sanitary closets. The school furnished the tools for doing the work, but the students who did the work received ten cents per hour for it.

One school reports that they have made, free of charge, 82 teachers' desks for the rural schools of the county, as well as other school furniture; filed saws for farmers whenever such were brought in, assisted farmers in the installation of gasoline engines, and have sent students from the school to repair engines when out of order.

Another school has been helping the farmers beautify their homes, helping them hang wallpaper, paint their homes and lay cement walks.

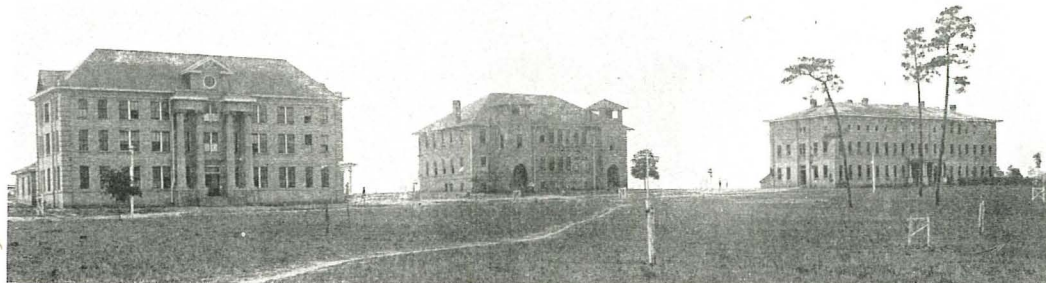
A great portion of this work has been done by the students on Saturdays. The schools gave this work in their regular courses, and after the boys become proficient they are sent out by the school to help the people. In this way it is possible to reach a great many more people than in any other way. Nearly all the students in these schools are boarding students and they are glad to make the trip to help some farmer, especially when there is likely to be a "Southern fried chicken dinner."

This year before its term closed, the Pearl River County Agricultural High School gave a course for the teachers of the county, lasting six weeks. The men had a short course in manual training, which will enable them to help their people. Other than the course in benchwork, they were given a course in painting, wallpapering and cement work. During the summer this school, working with the Model County Organization, offered the people an opportunity of attending school for six weeks absolutely free. The Manual Training Department of this school instructs and demonstrates how to make seed corn racks and tester, farm gates, portable fences, self feeding hog troughs, home made terracing implements, drags for making terraces and other home made farm implements, fireless cookers, iceless refrigerators, wheel trays, fly traps, chicken brooders and coops, modern wood box, screen doors and windows, hammocks and porch swings, cheap, homemade shower baths and other conveniences for the home.

A very practical course in cement work will be given and every man will have an opportunity to actually lay cement walks, build a hog dipping vat, concrete hot bed, fence posts, lawn benches, flower boxes and urns.

A course in home decoration will be devoted to instruction in selecting, matching and hanging wallpaper, tinting walls, staining and waxing floors, mixing and applying paints for exterior and interior work, furnishing a home according to size, location, means and the relation of home furnishing to the economical, the ethical and social side will be considered. Demonstrations in mixing and applying white-wash, striking, setting and filing saws, truing grinding stones and sharpening tools, will be given.

The school is trying the experiment of bringing the people to the school to do the extension work, during the summer months, when the growing crops do not require attention.



PEARL RIVER COUNTY AGRICULTURAL HIGH SCHOOL, POPLARVILLE, MISS.

A REPORT ON VOCATIONAL GUIDANCE.

The California High School Teachers' Association at its recent convention in San Francisco accepted a report on vocational guidance prepared by a committee headed by Mr. L. W. Bartlett and including Mr. F. W. Thomas, Miss Elsie J. Grover and Mr. G. A. Schnorrenberg.

The report reviews in detail the introduction of vocational guidance in California high schools and presents the following suggestions for the introduction of vocational guidance thruout the state:

Schoolmen who are considering the introduction of vocational guidance should bear in mind these four things concerning the individual:

That he is to be a factor in social and economic life, contributing thru his work to the life and well-being of the community.

That he will contribute most, and consequently receive the greatest enjoyment, in that work which he is best fitted to perform, and the contribution will increase with a superior skill and broadened outlook in that work.

That he can be educated in that work only in which he finds a certain element of happiness.

That it is the right of every youth to know the factors of vocations—health, social, economic, etc.—in order to make a wise selection of a life work, to prepare for it, and grow in it.

It is probably a just accusation of our schools that they have not done as much as they should for the youth who is looking forward to participation in productive life, particularly since the increase in complexity of the economic conditions into which he passes from the schools. The chance method of selection and consequent inadjustment is not good for the individual nor for society.

If we grant the four statements above are true, and experience seems to prove them so, any vocational guidance scheme should do these things:

1. Assist the pupil in self-analysis that he may know his interests and powers.

2. Acquaint him with the conditions of vocations.

3. Aid him in the selection of his life work, so that there is an adjustment of his powers with the demands of the vocation.

4. Help him in the direction of his preparation.

Several methods are employed to aid the pupil in self-analysis. One may be called the *experience* method, by which the pupil is allowed to exercise himself in the fundamentals of vocations by doing some work in those vocations. This necessitates the presence of vocation courses in the school systems, beginning preferably in the intermediate schools. Another method is the *interview*. By this the adviser leads the pupil, thru questions, to discover and inventory his qualities. In some places personal record sheets are used containing questions for the examinee to answer; but an experienced adviser is usually necessary to interpret the findings. Of interest in this connection is a card used in Pomona which records the observations of the teaching force. Each year each teacher from the first year thru the ninth records the qualities, interests, etc., of each pupil. With these before him the adviser is less liable to go astray in his suggestions.

After the pupil has analyzed himself he should have at hand an analysis of the vocations. This brings us to the second necessity in a vocational guidance scheme—that the pupil become aware of the condition of vocations. Several methods are used also to accomplish this. The *class*, *lecture*, and *advisership* methods are most frequently used.

Where the class method is used there is a great variance in the amount of time given to the subject, the content of the material, and the year in which it should be presented. An examination of the school life of a pupil reveals two periods where vocational guidance should receive special emphasis,—in the intermediate school, preferably in the ninth year, and again in the twelfth. Emphasis should be given in the intermediate school because this is a period characterized by instability, mentally and physically; it is a period of restlessness, sensitiveness, and great physical energy; it is a time of reaching out into the world to find

opportunities, and within oneself to know his powers; a period when ideals and companionships are formed that will shape the pupil's career; moreover, it is the time when so many leave school, often unaware of the seriousness of life problems. In the senior year guidance should again be emphasized because the pupil is face to face with vital questions—what work or what college—scholarships, courses, work opportunities, etc.

San Jose and Pomona High Schools give classwork in these periods. In Pomona the course in the ninth year is given for a semester, five days a week, if possible in separate classes for the boys and girls, and is compulsory. In the twelfth year it assumes the nature of an organization whose programs deal with vocational problems, given once a week for an hour thruout the year, also in separate classes for the boys and girls. Credit is given for the work in the ninth year. (The pupils will participate largely in the preparation of these programs.) In San Jose the classwork is offered in the ninth year under the title, "Educational Guidance." More specialized problems are given in the advanced class under the heading of life career study. The work is for a semester, five weeks in each, and is compulsory. In Polytechnic High, San Francisco, work is given three days a week in the ninth year for a semester, and again in the twelfth, the principal conducting the class in the senior year. Ferndale Union High also offers a course. These are the only four schools in the state that offer courses in vocational guidance. Other schools are giving it in connection with other work. Manual Arts, Los Angeles, makes it a part of the tenth-year English work, offering it for five periods a week for six weeks. This method is suggested by the Grand Rapids plan, where vocational guidance is given as composition work from the sixth grade thru the twelfth. The handling of the subject in a separate class seems to be the better method because of the advantage of continued concentration.

The second way mentioned for presenting information is the *lecture*. Practically every school interested in vocational guidance invites speakers to present some phase of the vocations they represent. It is often easier to secure speakers for a class than for an assembly of the entire student body. The Girls' High, San Francisco, is making good use of the abundance of material in the city. Pomona, in addition to occasional speakers, offered a lecture course for the intermediate schools, consisting of five representatives of different vocations. There is difficulty in securing speakers of force to present the elements of their vocations, particularly in the smaller towns. The committee, however, recommends the use of good speakers in presenting vocational problems. In Mankato High School, Minnesota, it is noteworthy that the different members of the faculty prepare reports on the different vocations which they present at the assemblies. A similar plan is followed at Polytechnic High, San Francisco.

The best exponent of the *advisership* method of imparting information is Fresno High School. Each day the pupils report for a thirty-minute period with group advisers, the grouping being determined by the vocations which the pupils have selected, those planning to become agriculturists being assigned to teachers of agriculture, etc. During this period the advisers present vocational guidance problems which have been outlined by two directors, one for the boys and one for the girls. The grouping of pupils with the teachers who are particularly interested in their choices is worthy of consideration.

The third and fourth necessities in the vocational guidance scheme—to aid the pupil in the selection of his vocation, and to select his subjects in preparation for it—are most satisfactorily handled by interviews, or conferences. Outlines of courses may be prepared for the direction of the pupils; nevertheless, dozens of questions arise which the adviser should answer. Then, too, the closer personal relation of teacher and pupil is desirable.

Thus far the committee has mentioned four things necessary in a guidance scheme. There are three corollaries to these that should be given place to make the scheme complete. Schools should concern themselves with the

vocational survey, the leakage from the schools, and the placement of pupils who leave school.

The survey observes and organizes the factors of vocations in a presentable form. Some material is on the market and other is coming constantly from the press. However, a knowledge of local conditions is necessary. This may be made a problem for the class. It is hoped that the surveys which are contemplated for sections of California may be assembled for school use.

The leakage from schools is no small problem. In this state, according to the Commissioner of Vocational Education, 50 per cent drop out before completing the eighth grade, and of those who enter high school, 64 per cent do not graduate. This results in a financial loss to the schools, and unpreparedness on the part of the pupil. It has been found that much may be prevented by a systematic interview and follow-up plan. In Pomona an effort is made to interview each one who leaves without sufficient reason, and a record of the conditions of his withdrawal and occupation is recorded. At a later date, if it seems wise, he is again interviewed. This takes time, but the results warrant it.

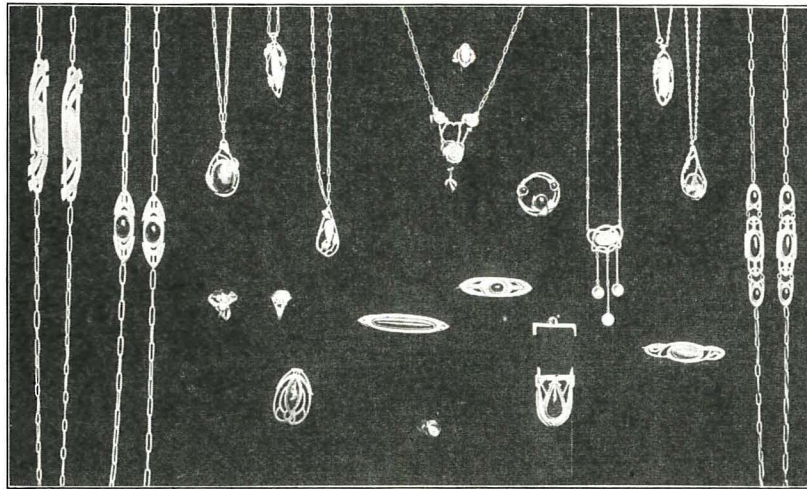
The placement of pupils who leave school to work is receiving the attention of many schools like Oakland Tech-

Superintendent of Schools, Pomona, made these statements in a paper presented at the Vocational Guidance Institute, Los Angeles, May 20: "I should unhesitatingly say that in a high school of, say, 150 pupils or fewer the principal should attend to the duties of vocational guidance. That, in fact, should be a large part of his duties. . . . In schools of fifteen high school teachers and three hundred pupils or more, some teacher should be designated a vocational adviser and should devote practically all his time to this particular work.

As a school approaches one thousand pupils in enrollment and fifty teachers in the faculty, one person can no longer handle all the work. I should then have two advisers, a man for the boys and a woman for the girls, who would devote practically all their time to the work. In cities of more than one high school, a fully developed Bureau of Vocational Guidance should be established. This bureau should be manned by a chief and several advisers, assigning two to each school." These statements by Superintendent Bennett give the side of the administration in sufficient terms.

TEACHING CONCRETE IN MANUAL TRAINING.

The first Short Course in Concrete for Manual Training and Vocational Teachers was held at Lewis Institute, Chicago,



JEWELRY MADE IN ART CLASSES, MILWAUKEE-DOWNER COLLEGE.

nical High, and Polytechnic High, Los Angeles. In the large eastern cities, where large percentages of pupils leave school upon reaching the work age, placement is given particular emphasis. The results are that there is less exploitation of the youth by employers, less drifting, and a longer continuance in school. It should be one of the functions of school systems to consider the disposal of its human output.

Summarizing the phases of a complete vocational guidance scheme, we have:

1. Classwork, preferably in the ninth and twelfth years.
2. Personal analysis and record, beginning early in the system.
3. Speakers representing the different vocations.
4. Advice, either by personal or group interview.
5. Vocation courses, and grouping present subjects into courses leading to definite fields.
6. Vocational survey.
7. Leakage from the schools.
8. Placement of pupils who leave, both those who graduate and those who leave before.

These eight phases are related, yet are sufficiently distinct to make it possible for a school system to attempt one or more as a beginning in vocational guidance. With such a start the work may gradually be extended until a complete program is in operation.

It is hardly necessary to state that such a program as is here suggested would require the services of an adviser or a bureau. The duties of these would depend on the size of the school and the extent of the work. G. Vernon Bennett,

June 26 to July 1, under the auspices of the Extension Division of the Portland Cement Association.

A "Get Together" luncheon was held in Lewis Institute gymnasium, and a welcoming address was delivered by Prof. John D. Shoop, Superintendent of the Chicago Public Schools, who spoke on behalf of the Chicago Association of Commerce.

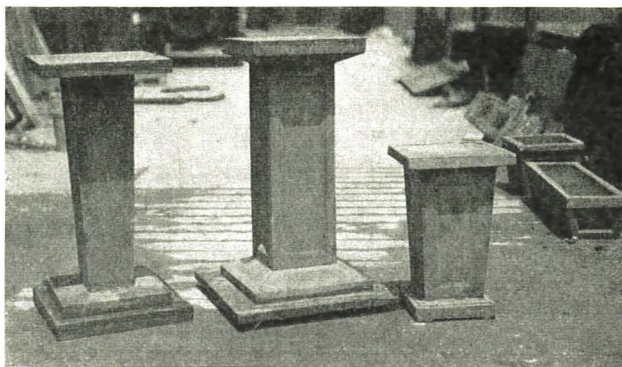
Mr. Shoop's welcome was reinforced by Director George N. Carman, of Lewis Institute. Later in the week, at a mid-day luncheon with the Association of Commerce, at the La Salle Hotel, Dr. Harris, retiring President of Northwestern University, spoke on the value of training the hand to work with the brain.

The course was divided into four sections in order that the subjects before each group might be handled efficiently.

Thoroness was the distinguishing feature at every session during the five days, as shown by an unusually strong array of lecturers, instructors and assistants.

Prof. D. A. Abrams, Professor in Charge, Structural Materials Research Laboratory, Lewis Institute, also discussed "Concrete Materials." C. S. Fletcher, Manager Sack Bureau of the Universal Portland Cement Company, handled "Cement Package and Storage Problems."

A. J. R. Curtis, Director Extension Bureau of the Portland Cement Association, showed the value of "Note Book Data." "Proportioning and Mixing" was handled by H. Colin Campbell, Director Editorial Bureau of the Portland Cement Association. "Practical Calculation" was



Pieces Made at Cement Institute.

handled by W. F. Beyer, designing engineer, Portland Cement Association.

C. M. Roefer, manual training demonstrator for the Portland Cement Association, explained "Forms for Monolithic Construction." B. H. Piepmeier, maintenance engineer, Illinois Highway Commission, lectured on "Concrete Highways." "Wooden Forms for Simple Objects" was discussed by Geo. A. Ross, instructor in charge wood work at Lewis Institute.

"Principles of Reinforcing" were explained by Ernest McCullough, chief engineer fireproof construction, Portland Cement Association. Concreting demonstrations were conducted by R. H. Williams, manual training demonstrator for the Portland Cement Association. "Concreting in Cold Weather" was discussed by Mr. Campbell of the Portland Cement Association Editorial Bureau. C. M. Wood, Manager Cement Products Bureau, Portland Cement Association, explained the "Hardening of Concrete Products."

"Hydrostone Building Construction" was discussed by James Barron of Barron & Harridge, manufacturers of hydrostone. "Concreting Practice" was divided into parties of five men each to construct objects of concrete. "Surface Finish" was discussed by Mr. Cornwell, and by A. J. Race

of the Cement Products Exhibition Company. "Plain Slab and Floor Work" was handled by J. C. Donaldson, field engineer, Portland Cement Association. A floor slab demonstration was given by H. S. Young of the structural materials research laboratory, Lewis Institute.

"Plaster and Mold Work" was discussed by Robert F. Havlik, chief engineer Mooseheart Institution, and Mr. Williams, manual training demonstrator. A demonstration in concrete work was given by a class of boys from the institution, which is supported by the Loyal Order of the Moose. Removal of forms from objects made the previous day was directed by Mr. Donaldson and Mr. Young. The "Manufacture of Portland Cement" and "The Stone of Baalbek" were subjects shown in motion pictures by Frederick Russell Clark, lecturer Extension Division, Portland Cement Association.

These subjects comprised the principal work of the week. Those interested came with their working clothes prepared to take full part in the proceedings, which they did with intense interest. Thus attired they went thru all the operations of mixing and placing concrete under the direction of Mr. Williams. Some of the actual work is shown in accompanying illustrations.

Near the close of the meeting, an informal dinner was given at the Sherman Hotel to teachers and others in attendance. Short, inspirational addresses were delivered by H. E. Miles, President of the State Industrial Education Bureau of Wisconsin, and Lorado Taft, the sculptor. Mr. Miles urged a still broader training of the hand to do practical things and the renowned sculptor, Mr. Taft, gave a hint of the architectural beauties which are yet to come in the future thru the adoption of concrete.

Both interest and attendance were beyond expectations and there is every reason to believe that this event—the first of its kind—will mark the beginning of a greatly increased interest in the work which it is intended to promote.

The record of the week is being prepared in the form of regular proceedings by the Portland Cement Association, 111 West Washington Street, Chicago, and when published will constitute practically an elementary textbook on concrete for manual training.

BOOK REVIEWS

Lettering.

By Thomas Wood Stevens. 121 pages. List price, \$2. The Prang Company, New York.

This book presents excellent examples of Roman capitals, Roman small italics, and Gothic forms intended to establish standards in these styles for use in hand lettering.

Instruction is given in the drawing and spacing of various styles of letters, and a chapter is devoted to the Phases of Letter Design.

It is an excellent text for the study and execution of the plainer forms of lettering.

The decorative elements of lettering are well presented for school instruction.

Millinery as a Trade for Women.

By Lorinda Perry, Ph. D. Prepared under the direction of Susan M. Kingsbury and Marion P. Smith. Cloth, 134 pages. Price, \$1.50; postage extra. Longmans, Green & Co., New York.

This study of the millinery trade, which is one in the series on economic relations of women, prepared by the Women's Educational and Industrial Union of Boston, will be welcomed for its clear analysis of the organization, processes, seasons, wages, and educational conditions of one of the most complicated of trades. While the study is limited to conditions in Boston and Philadelphia, the book is of general interest. It is safe to say that the essential conditions of the trade are the same thruout the United States except that wages are lower and hours are longer in smaller communities.

The author is frank in exposing the evils of the trade due to the number of "subsidized" workers, the short, in-

tensive seasons, the periods of idleness and the apparently high wage rate which in the long run is less than a living wage for the self-dependent woman. On the other hand, she is equally frank in showing the advantages of trade, its home character, the close relations of employees and employers, the attractiveness and opportunities of the artistic and handicraft divisions of the trade.

The book makes clear that the apprenticeship system employed in the trade is generally unsatisfactory as affording an opportunity to the learner to master the higher technical processes and the art elements of design, color, etc. There appears to be a distinct need and a large opportunity for supplementing and, in part replacing, this apprentice system by trade school instruction, continuation classes and "dull season schools." The former two may be of great value to very young girls while the latter may greatly increase the skill and earning capacity of older workers.

Essential Stitches and Seams.

By Mary Brooks Picken. Paper, 64 pages. Published by the Woman's Institute of Domestic Arts and Sciences, New York.

This pamphlet is instruction Paper No. 1, of the correspondence course in sewing offered by the Woman's Institute. It is characterized by the completeness and clearness which is the mark of all publications of the International Correspondence Schools, with which the Woman's Institute is affiliated.

Making Type Work.

Benjamin Sherbow. 129 pages. Price, \$1.25 net. The Century Co., New York.

This is a most refreshing little volume. While it deals with a technical subject, it does so in a perfectly understandable way. The surprise is that the book is interesting reading.

There are three headings under which the author arrays his wealth of material. I. Advertising print must command attention. II. Advertising print must get itself read. III. Advertising print must get itself understood. The author does not go into lengthy theoretical discussions of these topics. He takes numerous advertisements from various magazines and newspapers, points out their good and their bad qualities, and rearranges them according to his idea of the proper form.

This is an excellent book. It gives in a very clear way information which almost every person should have.

Woodwork for Secondary Schools.

Ira S. Griffith. 370 pages. Price, postpaid, \$1.75. Manual Arts Press, Peoria, Illinois.

This is a comprehensive work in nine chapters. The chapter headings, which will give the best idea of the contents of the book, are as follows: Common Woods, Tools and Processes, Woodworking Machines, Joinery, Wood Turning, Inlaying and Wood Carving, Wood Finishing, Furniture Construction, Pattern Making.

The volume includes much material along the lines of Mr. Griffith's earlier books as well as an abundance of new material on the same and additional lines of work. It is intended for use in secondary and vocational schools. The book is fully illustrated with line drawings and photographs. It will be a valuable help wherever it is used.

School of Practical Electricity.

Book IV. Magnetism and Application of Magnets. By Oscar Werwath, E. E. Cloth, pages 283-346. Price, \$1. Electroforce Publishing Co., Milwaukee, Wis.

This is the fourth volume in the series for practical electricians by Mr. Werwath and his associates. It takes up the theory of magnetism and the application of magnetic principles to commercial magnets, including electrical measuring instruments, etc. There are numerous problems of practical value.

Laws of Wisconsin Relating to Industrial Education.

Bulletin No. 1 (revised 1916), Wisconsin State Board of Industrial Education, Madison, Wis. Contains all Wisconsin laws on industrial education and such general school laws of the state as are related to industrial education.

MISCELLANEOUS PUBLICATIONS RECEIVED.

Lecture Notes for Canning Charts. Prepared by Grace M. Smith. Published by the International Harvester Co., Harvester Building, Chicago. The pamphlet makes the statement that one-half of the fruits and vegetables grown in the United States are wasted. The use of canned goods produced in the home is urged for greater variety in diet, for its wholesomeness, for its convenience in serving and for economy in living expenses. The method of canning by the cold pack system is described together with the advantages to be derived. In addition, facilities, commercial outfits, sealing, labeling and capping are discussed. There are lists of charts and slides, educational booklets and a time table. The pamphlet, which will be sent free to readers of the magazine, should be in every school kitchen.

Thirty-fifth Annual Report, Cincinnati Museum Association, 1915. Contains in detail, financial and statistical records, lists of donations and a brief account of the activities of the Art Academy. Gratifying progress in every department of the museum is noted in the report.

Elmira School Bulletin, June, 1916. Edited by Asher J. Jacoby, Elmira, N. Y. Contains a complete outline of the courses of study offered in the Elmira Vocational School. Some information is also included concerning the vocational courses in the high school and evening schools. The regular vocational classes offer in addition to general subjects, cabinetmaking, patternmaking, woodworking, plumbing, metalworking and electrical working.

Vocational Education. Paper, 12 pp. National Society for the Promotion of Industrial Education. A concise statement of the need of vocational education for girls and boys. An effective campaign document for local authorities who may wish to interest women's organizations.

Safety First for Vocational Schools. Prepared by Lewis A. Wilson. Bulletin 621. State Department of Education, Albany, N. Y. This bulletin is modestly intended to "furnish suggestive material" to school boards and teachers in safeguarding school machinery and in giving instruction in safety first courses. It is in reality a very complete manual of safety devices for all ordinary woodworking, metalworking and printing machinery such as will be found in school shops. The rules for safeguarding machines and for operating them are compiled from the best state factory codes and from the rules of important corporations, and include the best and completest statements which we have seen. The bulletin ought to be in the hands of every shop teacher in the country.

School Credit for Home Practice in Agriculture. By F. E. Heald. Bulletin 385. United States Department of Agriculture. This bulletin is intended to assist superintendents and country school teachers to give school credit for home work in agriculture. The pamphlet is made especially valuable by a collection of tables showing the amount of labor required in different sections of the country in handling different crops. These tables make it especially easy to evaluate children's work in different parts of the country.

Experiments in Industrial Education in New York City, 1916. Reprinted from the Child Labor Bulletin, Vol. V, No. 2. Published by the Child Labor Committee, 105 East 22nd St., New York City. New York City, where at least 35,000 children between 14 and 16 years have been receiving work permits each year, furnishes a tremendous field for experimentation in industrial training. Until this year, the New York State law has required as a preliminary for a work certificate, that all children between these ages give evidence that they have reached the age of 14, that they are physically fit and that they have completed the sixth grade. This year a law was passed which requires that a child under 15 who receives a permit must give evidence of having completed the eighth grade. The change means that 18,000 children 14 years old are ineligible for work permits in 1917. The pamphlet discusses the various schemes for the industrial training of minors, dividing these into private and public organizations. In the first division are mentioned Wanamaker's system, the department store classes, corporation schools, the school for printers' apprentices and the New York Trade School. Under the second are discussed the Manhattan Trade School for Girls, the co-operative classes of the New York City schools, the continuation classes for employed children, the operation and effect of the Gary plan as related to children under the legal working age, the Ettinger system of prevocational schools, vocational schools trade extension classes, and evening trade schools. There is a chart showing the extent of co-operation of the local industries with the high schools and a partial list of trade schools and public schools which offer special instruction to employed children.

Lessons on Tomatoes for Rural Schools. Bulletin 392, United States Department of Agriculture, Aug. 23, 1916. Ten simple lessons in tomato culture.

Concrete Linings for Irrigation Canals. Portland Cement Association, 111 W. Washington St., Chicago, Ill. 16 pages, free.

Ray Coleman has been re-elected for his fourth term as head of the Manual Training Department at Lakefield, Minn.

H. C. Billman, formerly instructor in manual training in the Benton High School, St. Joseph, Mo., has resigned to accept a position at Dayton, O.

PROBLEMS AND PROJECTS

The Department of Problems and Projects, which is a regular feature of the *INDUSTRIAL-ARTS MAGAZINE*, aims to present each month a wide variety of class and shop projects in the Industrial Arts.

Readers are invited to submit successful problems and projects.

A brief description of constructed problems, not exceeding 250 words in length, should be accompanied by a good working drawing and a good photograph. The originals of the problems in drawing, design, etc., should be sent.

Problems in benchwork, machine shop practice, turning, patternmaking, sewing, millinery, forging, cooking, jewelry, bookbinding, basketry, pottery, leather work, cement work, foundry work, and other lines of industrial-arts work are eligible for consideration.

The monthly award of a prize has been suspended for the months of August and September.

Drawings and manuscripts should be mailed flat and should be addressed:

The Editors, *INDUSTRIAL-ARTS MAGAZINE*, Milwaukee, Wis.

BOUDOIR BENCH.

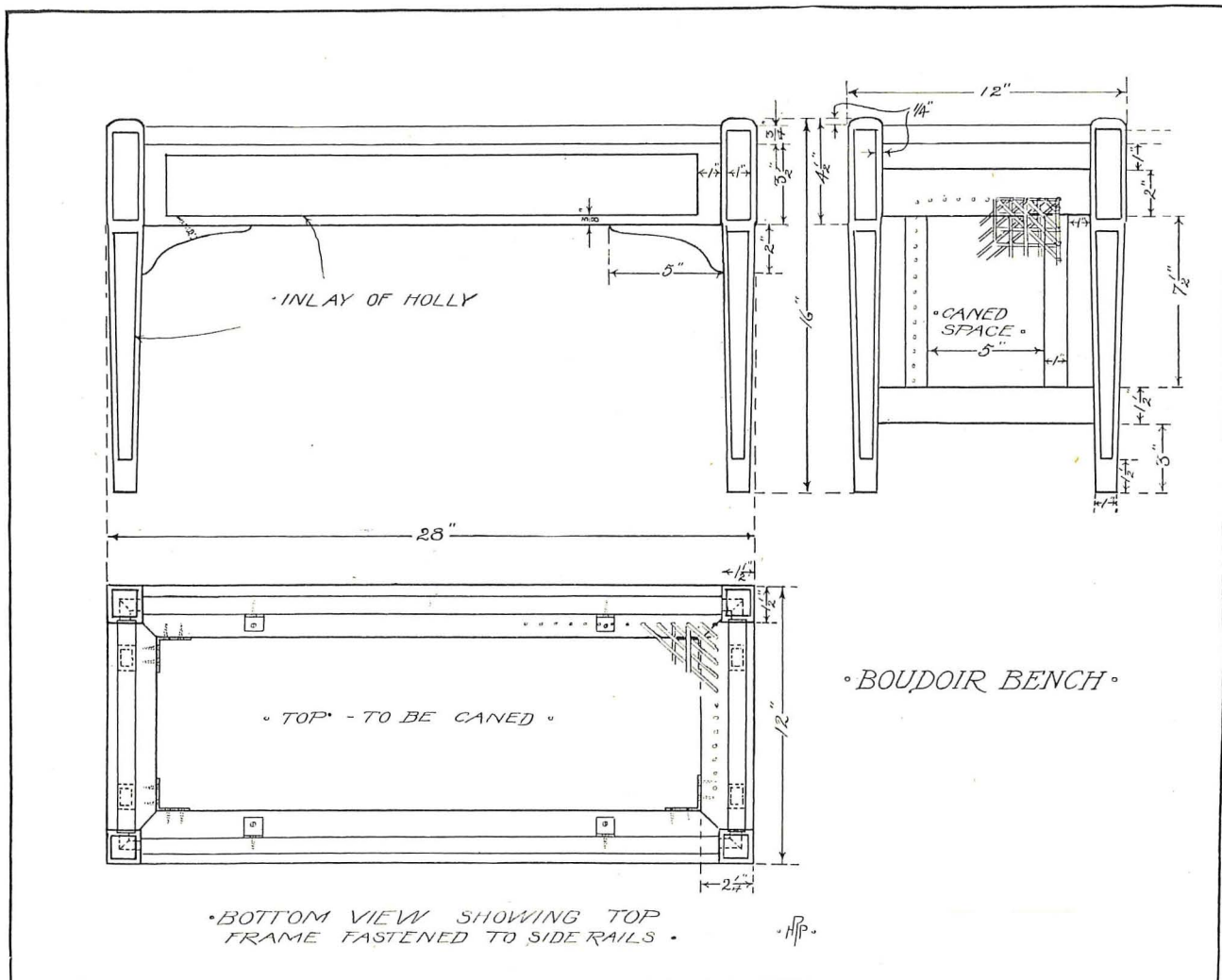
A Problem in Caning and Inlay.

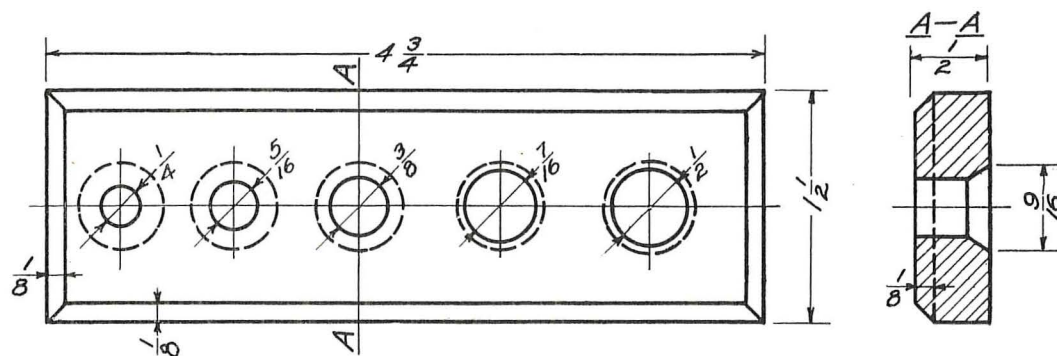
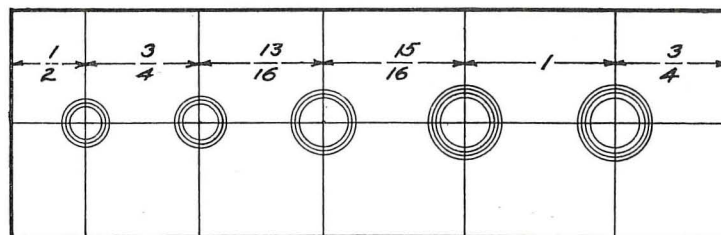
Howard R. Porter, Cheney, Wash.

This bench was first conceived as a problem in design, in an attempt to illustrate surface and contour enrichment. As it gave sufficient promise of pleasing results it was later worked out in one of the advanced cabinet-making classes.

The wood employed was black walnut, with an inlay of white hickory (since no holly was at hand). The hickory was cut out on the circular saw in strips one-sixteenth by three-thirty-seconds of an inch, and proved a very acceptable substitute for the holly, on account of its color and toughness. The grooves for the inlay were prepared by the marking-gauge method described in a former issue of this magazine. The top frame for the caning was put together with a half-lap mitered joint and reinforced on the inside corners with small corner irons.

In finishing, the color contrast of the walnut and inlay was somewhat heightened by an application of linseed oil, which was allowed to stand until almost dry, when it was



*Lay-out of holes.*DETAILS OF DOWEL PLATE
BY EDWARD BERG.

vigorously rubbed with a piece of canvas. This removed the excess, and left the wood well filled. Two coats of prepared wax completed the process.

The stock bill is as follows:

- Walnut: 2 pcs. $\frac{3}{4}$ "x4 $\frac{1}{2}$ "x28"—Side rails
 2 pcs. $\frac{3}{4}$ "x2 $\frac{1}{2}$ "x28"—Top frame
 2 pcs. $\frac{3}{4}$ "x2 $\frac{1}{2}$ "x12"—Top frame
 2 pcs. $\frac{3}{4}$ "x1 $\frac{1}{2}$ "x12"—Lower end rails
 2 pcs. $\frac{3}{4}$ "x2"x12"—Upper end rails.
 4 pcs. $\frac{3}{4}$ "x1"x10"—End stiles
 4 pcs. 1 $\frac{1}{2}$ "x1 $\frac{1}{2}$ "x16"—Legs

DOWEL PLATE.

Edward Berg, Washington High School, Milwaukee, Wis.

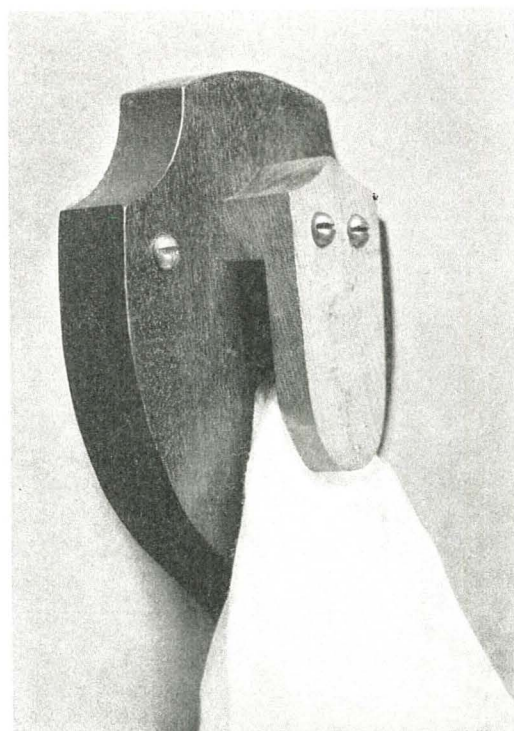
The dowel plate is a useful project, in that it can be used in woodwork for shafts, axles, pins and rods for mechanical toys, aeroplanes, etc. As an exercise it is a problem in locating and drilling holes accurately. It also involves sawing with the hack saw and filing.

Cut the stock from a bar of $\frac{1}{2}$ "x1 $\frac{1}{2}$ " cold rolled steel, allowing enough material to square up the ends. Clean a flat surface with a piece of emery cloth and coat with a marking solution such as copper sulphate diluted with water. If a copper sulphate solution is used the surface should be free from oil. This will leave a thin film of copper on the surface which when scratched will show bright lines that are permanent and will not erase thru handling.

Lay out the piece for length, scribing lines across the coated surface with a square. With the use of a surface gauge and surface plate, scribe a line the entire length of the piece thru the middle. On this line lay out the centers for the holes very accurately and draw short cross lines with a square. The dimensions should check up with end lines and the piece should be examined by the instructor before proceeding. If necessary, the lines can be removed and the surface prepared for another trial in laying out, by cleaning with emery cloth and recoating with marking solution. Prick-punch the centers with a light, sharp punch, just enough so that one leg of well pointed dividers will enter the impression. With the dividers, scribe circles the exact diameter of the holes. With diameter increased by 1-16-inch in each case, scribe other circles. Scribe similar circles 1-16-inch smaller in diameter than desired hole, and a few smaller circles as suggested by the drawing. With a heavy center punch mark each center so that the drill will start well and the piece is ready for drilling.

Run the point of the drill in a very short distance and observe whether the circle cut by the lips of the drill is

concentric with the scribed circles. If it is not, chip a small groove with a round-nosed groove chisel, to lead the drill true with the scribed circles. The drill will run towards the groove and consequently the piece should be chipped to lead the drill in the proper direction. Observe the piece often before the entire point of the drill has entered. This should not occur until the impression formed is concentric with the scribed circles. Countersink the hole, using a tool with an odd number of cutting edges, or better, a tool with one cutting edge. Bring the piece to length by filing to line and square with finished surfaces. Lay out the bevels with use of surface gauge, square and scribe and file to lines. Complete the piece by polishing top or beveled side only with emery cloth and oil. If the surface is badly pitted, draw-file before polishing.



Towel Holder.

A TOWEL HOLDER.

DeWitt Hunt, Oklahoma Agricultural and Mechanical College, Stillwater, Okla.

This towel holder is an excellent model for classes which are seeking relief from the much over-worked tie-rack, book-holder and similar projects. It is best used to fill in a period at the end of a term and requires some skill to construct.

Any scrap wood may be used, altho a hardwood, like maple or oak, gives the best results. The boys may design the back in the shape of a shield, a hexagon or an ellipse, modifying the holder proper to correspond.

Fully a thousand holders have been made by boys in the author's classes.

PLACKET FOR UNDERWEAR.

S. Edith Cole, Lawrence, Kans.

This placket has been found especially good for underwear and as a preliminary lesson in making a mitre.

If desired, a model may be made by hand, using the backstitch on all sewing lines.

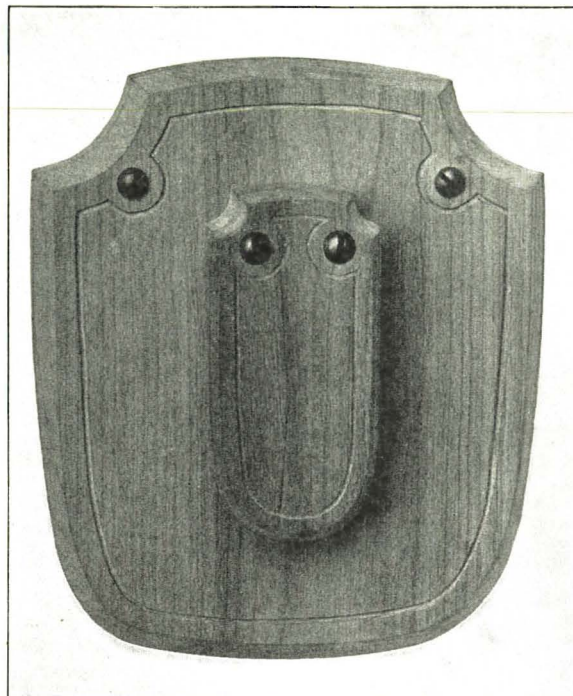
Make a slit the desired length (at least 8" in the average underwear, tearing if possible). See Fig. I.

With the garment flat on the table, the slit away from you, fold back the left-hand piece. This piece represents the back of the leg. See Fig. II.

Fold on dotted line, on front portion, $\frac{1}{8}$ " from edge, tapering to nearest turn at end of slit. See Fig. II.

Take a piece of English twill tape $\frac{3}{4}$ " wide, and at least $\frac{1}{2}$ " longer than twice the length of the slit (for good making).

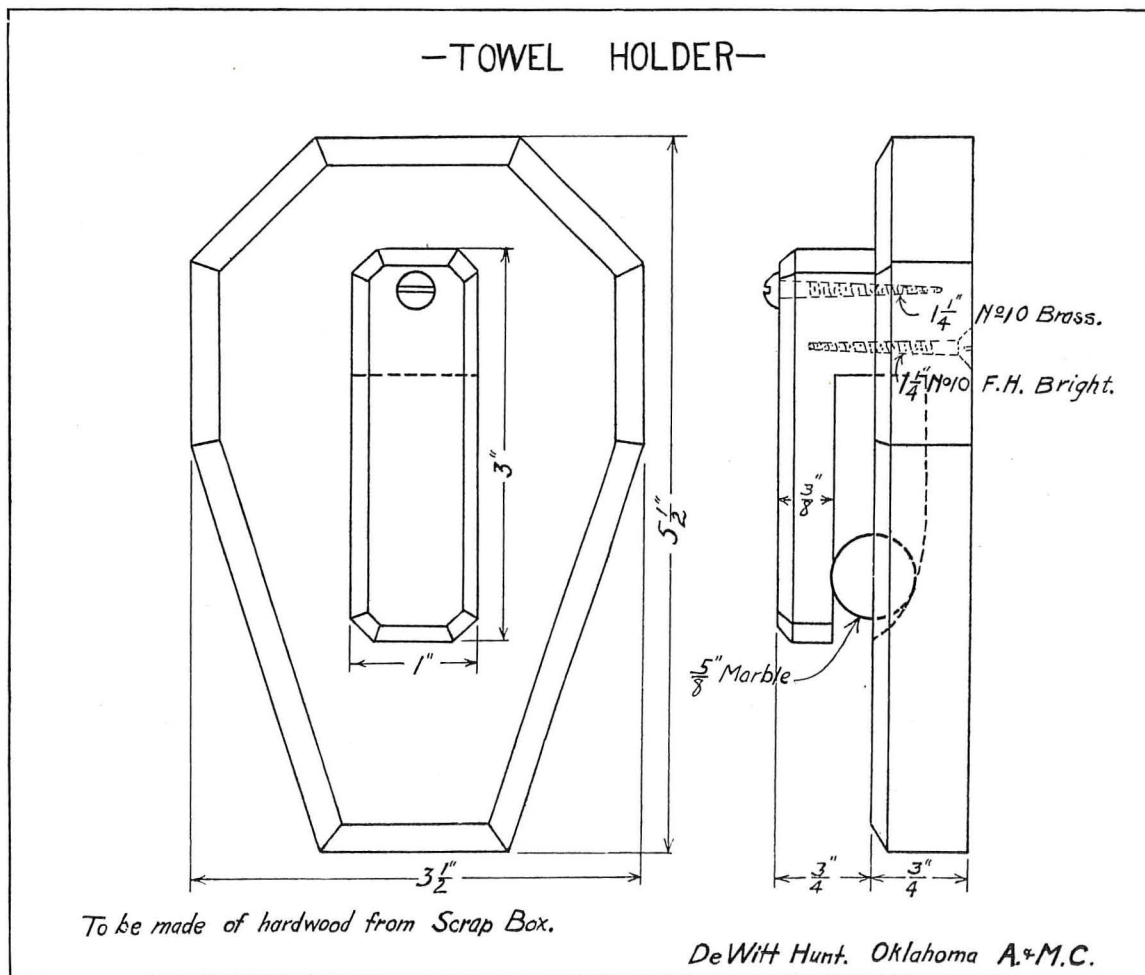
With the garment flat, place the tape on the right side even with the folded edge; pin carefully, then extend along raw edge of back, lapping $\frac{1}{8}$ ", and pin. Baste carefully, then stitch on both edges of tape, on front portion, and on the one edge of back portion. (See Fig. III.)

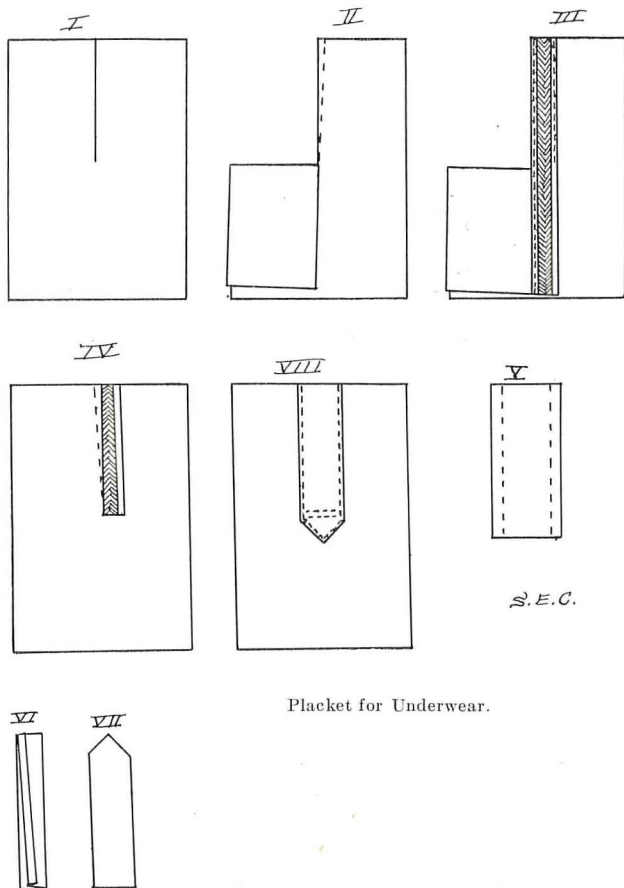


Towel Holder.

When folded in position, the two pieces of tape should lie directly over each other, the raw edge of back portion coming on right side of underwear leg. (See Fig. IV.)

We are now ready for the mitred facing. Tear a strip





Placket for Underwear.

lengthwise the material, $\frac{1}{2}$ " wider than twice the width of tape and 1" longer than length of slit. See Fig. V.

Fold long edges under $\frac{1}{4}$ ", then fold right sides together and whip the two raw edges together, at one end. Do not use a knot and fasten thread securely. (See Fig. VI.)

Fold right side out and press flat. (See Fig. VII.)

This mitred facing is then placed on the right side of back portion, with folded edge even with tape and extending $\frac{1}{4}$ " below end of slit. Baste, being careful to have the point of mitre directly below end of slit and true with the warp threads. Stitch as in Fig. VIII. The two stitchings at the mitred end are just below the folded tape.

If two plackets are made care must be taken to reverse the first turning.

This placket will not tear and makes a perfect closing.

PORTABLE LAMP.

N. L. Franklin, Madison, Wis.

A problem which can be carried out by any member of a class in woodturning is an electric lamp. This lamp may be made from any suitable material, but preferably black walnut or mahogany.

For the spindle, a block $2\frac{1}{4}'' \times 2\frac{1}{4}'' \times 13''$ is required; it may be glued up in strips, or cut from a solid piece. When the glue is set, the center of each end is found, and a $\frac{3}{8}''$ hole bored for the light cord. By plugging the hole in one end and using a cone center in the tailstock of the lathe, the piece can be centered and

roughed down to the largest diameter, and the pin turned for the base.

The block for the base may be made in one piece or glued up in strips. It is put on to a faceplate and a hole cut in the center to admit, with a tight fit, the pin just turned on the spindle. The spindle and base may now be glued together, and turned to the proper dimensions as one piece.

An excellent finish for black walnut is to fill with dark filler and finish with three coats of prepared wax, or French polish of shellac and oil, applied while in the lathe.

The electrical supplies necessary are: 1 socket plug, 1 socket, 1 shade support, 1 piece of $\frac{3}{8}''$ brass pipe threaded at both ends, 3 feet of lamp cord.

Screw the brass pipe into the top of the stand; the socket fits on to the projecting end and holds the shade supporter in place.

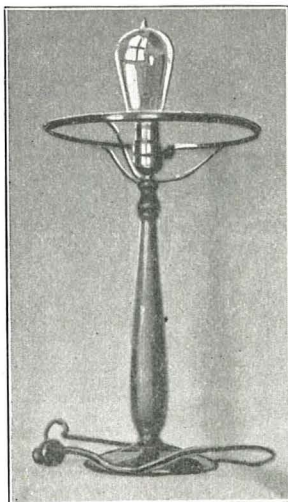
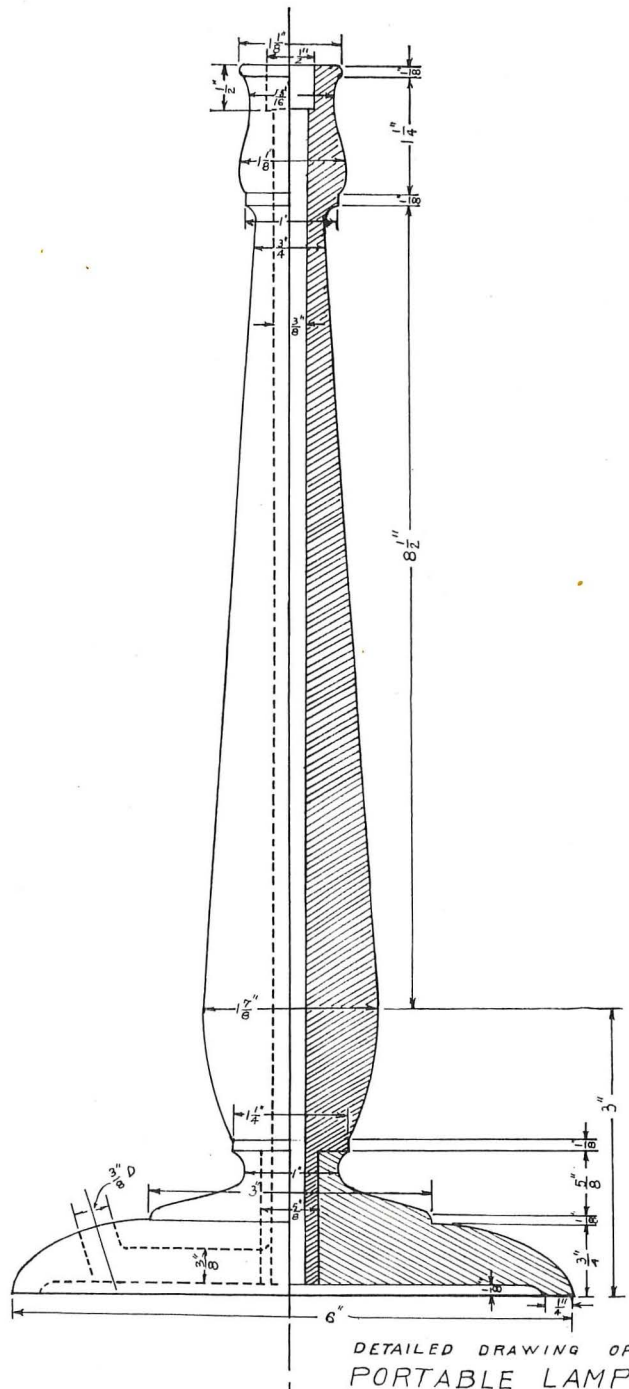


Table Lamp.

DETAILED DRAWING OF
PORTABLE LAMP

NOW, ARE THERE ANY QUESTIONS?

This department is intended for the convenience of subscribers who may have problems which trouble them. The editors will reply to questions, which they feel they can answer, and to other questions they will obtain replies from persons who are competent to answer. Letters must invariably be signed with full name of inquirer. All questions are numbered in the order of their receipt. If an answer is desired by mail, a stamped envelope should be enclosed. The privilege of printing any question and reply is reserved. Address, Industrial-Arts Magazine, Milwaukee, Wis

Miscellaneous.

459. Q.—Can you please answer the following questions:

(1) Names of best books on painting, explaining the uses of oils, dryers, terebine, knotting, gold size and wood fillers, suitable for manual training use; (2) A solvent for copal, shellac, kauri gum and the fossil gum from the Philippines to allow of their being used as sizes.

A.—(1) It is hard to give an exact answer to this question, since nothing is intimated as to whether practical or chemical information is desired. Perhaps, the best book covering both phases of the subject is Holley's Analysis of Paint and Varnish Products (John Wiley & Sons, New York). It is written in language easily understood by one who has the equivalent of a high school chemical course and is quite practical. For another treatment of the subject, would suggest Kelly's Expert Wood Finisher (Ashmun Kelly, Malvern, Pa.). This book is quite complete, fairly reliable and covers the art and practice of finishing woods. The price of either is \$3.

(2) This question is unintentionally mixed up, since copal and kauri are both fossil gums and require a different solvent than shellac, which is the excrement from an aphid, which lives on pine trees. In the preparation of copal and kauri gum for use as a size, it is necessary that some form of varnish makers' outfit be obtained; this consists essentially of a copper kettle with a hood and some means of applying heat to the base of the kettle and a chimney for drawing off the vapors from the varnish kettle. The fossil gum is placed in the kettle, fused until thoroughly melted and about one-third of the weight of the gum is taken as a proportion for hot linseed oil which is added shortly after the gums become completely fused. Care must be taken to avoid burning or scorching the mixture, in which case it will be neither so pale or durable as if properly cooked. The oil and rosin are cooked together until they are so combined that they will not separate on cooling. This is tried by putting a drop on a piece of glass and if it clouds on cooling, the combination is not complete; in fact, it is common to cook varnish more than this; the more it is cooked the greater becomes its viscosity and the more turps it will take to thin it to its proper consistency. Viscosity is spoken of by American varnish makers as "body." An American says a varnish has a heavy "body" when an Englishman says it is "stout." When sufficiently cooked, the oleo-resinous compound is removed from the fire and a small amount of turps is added slowly and with constant stirring. About three per cent of metallic driers should be added to insure the proper oxidation of the varnish. The addition of the latter should be performed where there is no danger of the fumes reaching the fire. For use as a size this varnish body now obtained should be cut with turps, until very thin, in which case it is ready to use after being cooled and aged for some months to allow thoro settling.

As regards a solvent for shellac, there is but one, alcohol. The proper way to cut this shellac in alcohol is to take four pounds of the flake shellac and put it in a granite or earthenware vessel with a tight cover. Pour in a gallon of denatured or grain alcohol, being careful not to stir up the mass of shellac. Cover and let stand over night. This treatment will insure the proper swelling of the shellac so that it can be readily brought into solution by stirring the next morning. This mass should be stirred thruout the day at intervals of about an hour and when completely in solution, should be strained thru silk. For use as a size, have the proportion of shellac to alcohol as one pound of shellac to three gallons of alcohol. For use on furniture or other woodwork this proportion should be two and a half pounds of shellac to a gallon of alcohol. In the manufacturing of shellac this process is carried on very quickly by placing the flake shellac and

alcohol in a churn and rotating at a high rate of speed—R. G. Waring.

Books on Gas Engine Construction.

460. Q.—We give a course in gas engine construction. Could you inform me where I could get books giving drawings of different kinds of gas engines?—A. P. L.

A.—See list published in this column, January, 1916. Page 46.

Drawings for Tables.

461. Q.—Where can I obtain a book giving drawings of several different kinds of tables?—A. P. L.

A.—Designs for tables will be found in practically all books on woodworking for schools. Especially good are: *Crawshaw's Furniture Design for Schools and Shops*, (Price, \$1), and *Problems in Furniture Making*, (Price, \$1), Manual Arts Press.

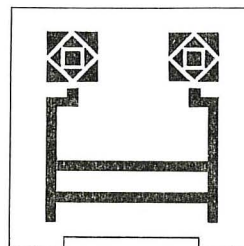
Nye's *Furniture Designing and Drafting*, (Price, \$2), W. T. Comstock & Co., New York.

Griffith's *Advanced Projects in Woodworking and Furniture Making*, (Price, 75 cents), Manual Arts Press.

Also the furniture blueprint series of the Periodical Publishing Co., Grand Rapids, Mich., Dewey Blueprint Co., Denver, Colo., and the Manual Training Supply Co., 49 Pine Ave., Chicago, Ill.

Colored Designs.

462. Q.—Can you tell me the method of putting colored surface designs on woodwork? This sketch illustrates a sample. The conventionalized roses are red, the stems and bars green, and the background brown, and the grain of the wood is not obscured completely. In trying to imitate this



sort of work I find that the stains run or creep in the grain of the wood; and I suppose there must be some method of treating the line or small groove around the design to prevent this, or else some special stain that does not run.—R. M. J.

A.—I would say that it would be desirable to stain the portion of the wood which will be the background to the necessary color, which, in the instance cited, is brown. I should prefer that this stain be a water stain because of the transparency which will develop from use of this type.

The next thing necessary is to give a very thin coat of white shellac over the entire piece; let dry one hour and sand lightly with 00 sandpaper. Now, transfer the design and line it in with an agate stylus or other hard, round point so that the outline of the design is very slightly indented. With a small camel's hair brush lay on the other colors which should be soluble in alcohol. The nature of this stain will be such as to enable it to mix with the small amount of shellac already on the surface. Care should be exercised to brush with the grain as much as possible. When all the colors are applied and have dried at least one hour, give the whole object at least one coat of Pratt & Lambert's No. 38 preservative varnish or similar light bodied and light colored varnish. Let this dry three days before polishing or rubbing.—Ralph G. Waring.

Textbooks on Shop Mechanics and Shop Physics.

453. Q.—Kindly give me information as to books on shop mathematics and shop physics.—W. P. S.

A.—*Colvin and Cheney's Machinshop Arithmetic*, \$0.50, N. W. Henley Co., New York; *Breckenridge, Mesereau & Moore's Shop Problems in Mathematics*, \$1, Ginn, Boston; *Norris & Smith's Shop Mathematics*, \$1.50, McGraw-Hill Co., New York; *Jameson's Practical Shop Mechanics and Mathematics*, \$1, John Wiley, New York; *Burnham's Mathematics for Machinists*, \$1.25, John Wiley, New York; *Hiscox's Mechanical Movements, Powers and Devices*, \$2.50, N. W. Henley Co., New York; *Merrill's Elements of Mechanics*, \$2.50, John Wiley, New York; *Textbook of the Principles of Machine Work*, \$3, Industrial Education Book Co., Boston; *Low's Elementary Textbook of Applied Mechanics*, \$0.80, D. Van Nostrand Co., New York.

Books on Mechanical Drawing.

465. Q.—Will you please send me information on textbooks for second-year mechanical drawing?—P. L. B.

Stanley's Mechanical Drawing and Shop Practice, Moore, \$4, McGraw-Hill Co., New York; *Brace's Mechanical Drawing for High Schools*, State Department of Education, St. Paul, Minn.; *Sampson's Mechanical Drawing and Practical Drafting*, \$1.50, Milton Bradley Co., Springfield, Mass.; *Jameson's Advanced Mechanical Drawing*, \$1.80, net, John Wiley & Sons, New York; *J. S. Reid's Mechanical Drawing, Elementary and Advanced*, \$2, John Wiley & Sons, New York; *Leeds's Mechanical Drawing for Trade Schools*, (machinery trades edition, \$2; high school edition, \$1.25), D. Van Nostrand Co., New York; *Kennedy & Norton's Mechanical Drawing*, \$2, Varsity Supply Co., Cambridge, Mass., (course at Harvard University); *Miller's Mechanical Drafting*, \$1.50, Manual Arts Press, Peoria, Ill. (for advanced high school students and first-year engineering).

Books on Wood Finishing and Wood Turning.

466. Q.—I would like to know the names and addresses of publishers of books on wood finishing and wood turning.—V. A. T.

A.—*Kelly's Expert Wood Finisher*, \$3, Ashmun Kelly, Malvern, Pa.; *Schmidt's Problems of the Finishing Room*, \$5, Periodical Publishing Co., Grand Rapids, Mich.; *Maire's Modern Wood Finisher*, \$0.50, Western Painter, Chicago, Ill.; *Hasluck's Wood Finishing*, David McKay, Philadelphia, Pa.; *Galloway's Staining, Varnishing and Enameling*, \$1.25, Painters Magazine, New York; *Whigell's Architectural Hardwood Finishing*, \$1, Painters Magazine, New York; *Godfrey's Hardwood Finisher*, \$0.50, Building Age Book Dept., New York; *Hodgson's Practical Up-to-Date Finisher*, \$1, Building Age Book Dept., New York; *Sabin's Technology of Paint and Varnish*, John Wiley & Sons, New York; *Hurst's Painters' Colors, Oils and Varnishes*, J. B. Lippincott Co., Philadelphia, Pa.; *Gardner's Everybody's Paint Book*, M. T. Richardson Co., New York; *Hints for Painters and Decorators*, Industrial Publication Co., New York; *Standage's Decoration of Metal, Wood and Glass*, John Wiley & Sons, New York.

Crawshaw's Problems in Wood Turning, \$1, Manual Arts Press, Peoria, Ill.; *Selden's Elementary Wood Turning*, \$1, Rand, McNally Co., New York; *Ross's Wood Turning*, \$1, Ginn & Co., Boston.

Clock Movements.

469. Q.—Can you tell me where I can get the works of a clock suitable for a hall clock project in manual training?—D. R. B.

A.—American Chime Clock Company, 1655 Ruffer St., Philadelphia; Grand Rapids Clock & Mantel Co., Grand Rapids, Mich.; E. Howard Clock Co., 67 Maiden Lane, New York; Waltham Watch Co., (Clock Dept.) Waltham, Mass., and Seth Thomas Clock Co., Thomaston, Conn.

If any of these firms should fail to sell direct to you, you can buy their movements thru your local clock and jeweler dealer.

Pamphlet on Dietetics.

470. Q.—Can you put me in touch with some colleges, universities or publishing houses which put out pamphlets on dietetics?—N. E. L.

A.—Books, pamphlets and charts on dietetics may be bought from Whitcomb & Burrows, Boston, Mass.; Journal of Home Economics, Roland Park, Baltimore, Md.; The Macmillan Co., 66 Fifth Ave., New York. Also (miscellaneous bulletins and charts) from United States Department of Agriculture, Washington, D. C.; (technical education bulletins) Teachers College, Columbia University, New York; (reading course bulletins) from New York State Agricultural College, Ithaca, N. Y.; (bulletins) Iowa Agricultural College, Ames, Ia.; (extension bulletins) University of Wisconsin, Madison, Wis., and University of Illinois, Champaign, Ill.

PUBLICATIONS RECEIVED.

Micromotion Studies Applied to Education. By A. A. Douglass and W. L. Dealey, Clark University. Reprinted from the Pedagogical Seminary, June, 1916. This study was made in co-operation with Frank B. Gilbreth and L. M. Gilbreth and contains excerpts from numerous articles and addresses describing the details and possibilities of standard measuring devices. The experimental work was done at Clark University and in the Gilbreth laboratory. Among the useful devices in modern industrial management, micromotion study as developed by Gilbreth, a consulting engineer of international reputation, constitutes a method admirably fitted to study methods of instruction and processes of learning. While the preliminary experiments have thus far been limited to the practical arts and while the technique used is more applicable to the arts, indications point out that it may be used with the phonograph feature to study other school subjects as well. Two fundamental problems studied were how to have educational processes conclusively tested by competent observation under experimental control and how to professionalize the whole number of practitioners engaged in education for the sake of a quick and efficient response. In an analysis of motion elements taken from the records of individuals, Gilbreth suggests the following cycle of decisions and motions: Search, find, select, grasp, position, assemble, use, take apart, inspect, transport, load, preposition for next operation, release load, transport, empty, unavoidable delay, avoidable delay, rest. Plates are given showing the movements made by a boy in taking and using certain tools.

The Gilbreth methods not only chart actual movements with exactness, in three dimensions, including time, but process is arrived at as well. The pictures, which were taken in the Bridgham School, Providence, R. I., showed the classes in manual arts, household arts and geography of the sixth and eighth grades. The pictures were taken without previous notice to the pupils and with their voluntary presence in the rooms. Under the stimulus of this new field of experimentation, the authors believe that there will doubtless be a rapid development of many-sided applications to the newer subjects of the school curriculum.

Properties of the Calcium Silicates and Calcium Aluminate Occurring in Portland Cement. Technological paper No. 78, United States Bureau of Standards, Washington, D. C. It has been shown comparatively recently that the constituents of Portland cement or normal composition and normal burning are tricalcium silicate, dicalcium silicate and tricalcium aluminate. The present investigation was undertaken by the Bureau of Standards to show what part each of these played in developing the physical properties of cement. The pamphlet will be of interest to teachers who desire to study the chemistry of cements. Copies may be had gratis thru the Bureau.

Experiments in Industrial Education in New York City. Issued by the National Child Labor Committee, 105 E. 22nd St., New York City. A brief descriptive outline of the private and public opportunities for industrial education open to children in New York City.

School of Practical Arts, Columbia University, Bulletin announcing courses of study for the scholastic year 1916-17.